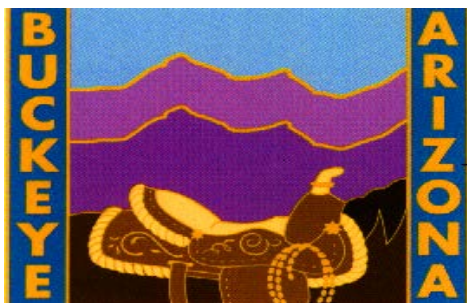


WATER

Section 3-3

STEEL STORAGE TANKS



The Town Of *Buckeye* Arizona

Engineering Design Standard

Section 3-3

Adopted December 2012

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Section 3-3 – Steel Storage Tanks

This section provides policy and standards establishing design criteria for constructing and modifying water systems to be dedicated, and conveyed to the Town pursuant to, and in accordance with, Town Code. Upon Town acceptance of the water infrastructure, and dedication and conveyance to the Town, the Town will own, operate, and maintain such infrastructure. This section provides guidance on design report preparation, transmission and distribution systems, fire protection, and final plans preparation.

The requirements of this section may be modified at any time by the Town Engineer.

The Town Engineer may approve variances to the requirements of this design standard. Variance requests must be submitted in writing and include a justification for the variance requested. A copy of the Town approved variance shall be included with the submittal of any plans or design reports to the Town that incorporate the variance.

The Town Engineer is required, pursuant to Chapter 23, Article 23-2, of the Town Code, to develop standards and detail regarding public improvements to be constructed within the Town. The standards, design criteria, and policy set forth in this section were developed and recommended by the Town Engineer pursuant to Chapter 23, Article 23-2 and adopted by Town Council in Resolution No. 135-12.



3-3 Steel Storage Tanks

3-3.000 General Information:

3-3.001 Steel Storage Tank Requirements:

- A. This section is to aid the engineer in developing a steel storage tank design to meet the Town of Buckeye minimum standards.
- B. Developers/Landowners are required, pursuant to the Town Code, including the Town Development Code, to install, at their expense, all improvements necessary to provide water service to their development. This will include booster pump stations, reservoirs, transmission mains, distribution mains, pressure reducing stations, treatment technology, or other facilities; and the payment of all required development fees.
- C. Developers/Landowners shall install, at their expense, all on-site and off-site improvements necessary to serve their developments.
- D. Storage tanks located within the facility shall be constructed in accordance with the most current version of the American Water Works Association (AWWA) standards D100, D-102, and D-104 for construction, coating and cathodic protection for at grade welded steel reservoirs.
- E. All steel storage tanks shall be 100% welded.

3-3.002 Definitions and Abbreviations:

- A. ADEQ - Arizona Department of Environmental Quality
- B. ANSI - American National Standards Institute
- C. ANSI/NSF Standard 60 - *American National Standards Institute/NSF International Standard 60 - 2000a, Drinking Water Treatment Chemicals – Health Effects, November 2000*
- D. ANSI/NSF Standard 61 - *American National Standards Institute/NSF International Standard 61 - 2000a, Drinking Water System Components – Health Effects, November 2000*
- E. A.R.S. - Arizona Revised Statutes
- F. ASTM - American Society for Testing and Materials
- G. AWWA - American Water Works Association
- H. CMP - Community Master Plan
- I. Developer - Shall mean the individual or entity causing Development of land in the Town, including Development companies authorized to act on behalf of the Developer and the term Developer shall also mean a contractor (“Contractor”) authorized to act on behalf of the Landowner or Developer. Developer shall also be interpreted to mean Landowner.
- J. Development or development - Shall have the same meaning as defined in the Town Development Code.
- K. DFT – Dry Film Thickness in mils
- L. Distribution System - A pipeline, appurtenance, device, and facility of a public water system that conducts water from a source or water treatment plant to persons served by the system.
- M. D.I.P. - Ductile Iron Pipe



- N. Engineer or engineer - An engineer registered professionally in the State of Arizona pursuant to the provisions of A.R.S. §32-101; §§32-121-131; §§32-141-152, as amended.
- O. EPA – United States Environmental Protection Agency
- P. IBC - International Building Code
- Q. Landowner - Shall mean the owner of the land in the Town on which Development occurs. “Landowner” shall also be interpreted to mean Contractor and/or Developer, including Development companies authorized to act on behalf of the Developer/Landowner.
- R. MAG - Refers to the Maricopa Association of Governments Uniform Standard Specifications and Details for Public Works Construction current edition.
- S. MCESD - Maricopa County Environmental Services Department
- T. Plan(s) or plan(s) - Design drawings that are 100% complete and sealed by a registered professional Engineer as defined above.
- U. Public Works Inspector - A Town employee or contracted consultant with a primary responsibility of monitoring the construction of improvements for conformance to Town requirements.
- V. ROW - Public Rights-of-Way
- W. SSPC - Society for Protective Coatings
- X. Tank - Above ground steel water storage tank.
- Y. TOB - Town of Buckeye
- Z. Town - Town of Buckeye
- AA. Town Engineer - Town of Buckeye Town Engineer or designee
- BB. Water Campus - Water facility with storage reservoir, booster station, chlorination equipment, treatment facilities, and other appurtenances required to deliver water.

3-3.003 Design Policy:

- A. Developers/Landowners shall comply with the Town’s requirements for expansion of water systems to newly developed areas and subdivisions inside the Town’s service area.
- B. Tanks shall be installed per Town approved master plans for this service area. The design can be phased with development as long as all water storage needs are being met.
- C. Tanks shall be a part of all new water systems and are the responsibility of the Developer/Landowner extending the Town service area.
- D. The Engineer, a registered professional in the State of Arizona, shall analyze the water demands from a proposed development and determine its impact on the Town’s Water Distribution System, pumping and storage systems as well. The Engineer shall certify an analysis that encompasses the development area, adjacent mains and booster stations where deemed necessary by the Town. All analyses shall conform to all approved master plans in that service area. The effects of peak water demands and fire flows shall be evaluated to ensure proper sizing of proposed water facilities. If no water campus exists to serve the development, the Engineer shall demonstrate to the satisfaction of the Town, that a water source or water sources are available to serve the demands of the development and that a water campus can be constructed to serve the demands of the development.



- E. Town approval of plans and associated design reports are valid for 1 year from the date of Town Engineer's signature.
- F. Engineering Bulletin No. 10, *Guidelines for the Construction of Water Systems* published by the Arizona Department of Environmental Quality, as well as the Arizona Administrative Code, *Title 18 - Environmental Quality*, contain specific requirements for submittals, approvals and notifications when improvements of public water system are proposed. The Developer/Landowner and the engineer designing the plans shall comply with all laws, regulations, and requirements.
- G. All Developers/Landowners desiring or required to connect to the Town water system are required to be annexed within the Town's corporate limits.
- H. All construction documents shall be prepared by a registered Professional Civil Engineer licensed and practicing in the State of Arizona pursuant to the provisions of A.R.S. §§32-101, 32-121 to 131; 32-141 to 152. Each sheet of the plans shall include the appropriate professional State of Arizona seal, signature, date and date of expiration below seal. The Town does not require original seals and or signatures (wet seal) on design documents during the review cycle.
- I. All final plans that include tank construction or phasing to a Town booster system shall be submitted to the Town of Buckeye for review and approval. Plan review fees shall be paid at the time of plan submittal.
- J. All final plans that include fire protection within the Town's corporate limits, even if the water provider is a private water provider, shall be submitted to the Town of Buckeye for review and approval. Plan review fees shall be paid at the time of plan submittal.
- K. All Town details are used for schematic only and do not eliminate the need for engineering design. Items shown in the details are a Town minimum. In no case shall a proposed item be less than what is shown in the details. It is responsibility of the design engineer to design and seal all aspects of the tanks and verify all Town minimums and requirements.

3-3.004 Diligence:

- A. Developers/Landowners shall verify the need for any water system improvements necessary to provide service to a site or to provide onsite facilities. Available resources in which to find this information:
 - 1. Records – obtain existing utility maps and As-Built drawings.
 - 2. Town's website – <http://www.buckeyeaz.gov>.
 - 3. The Town Engineer can confirm the need for any required extension or condition for water service.
- B. All entities seeking water service from the Town need to be familiar with Town Code, including Chapter 17 of the Town Code.
- C. Any apparent field condition, error, omission, etc. shall be brought to the attention of the Town Engineer.

3-3.005 MAG Reference:

- A. The engineer should be familiar with the *MAG Uniform Standard Specifications for Public Works Construction*, including all applicable Standard Details. These documents contain construction related specifications and details that impact the design of water systems including trenching, bedding, backfill, and pavement replacement, etc.



3-3.006 Standards:

- A. The following is a list of national, regional and local resources (the latest editions unless otherwise stated), which are referenced and used for the design within the Town of Buckeye.
1. Resources, Standards and References:
 - a. American Water Works Association, AWWA
 - b. American National Standards Institute, ANSI
 - c. ANSI/AWWA D100, *AWWA Standard for Welded Carbon Steel Tanks for Water Storage*
 - d. ADEQ Engineering Bulletin No. 8 and 10
 - e. *MAG Uniform Standard Specifications for Public Works Construction*
 - f. American Petroleum Institute Standard 650
 - g. Society for Protective Coatings, *SSPC-PA 2 Procedure for Determining Conformance to Dry Coating Thickness Requirements*

3-3.007 EPA Regulations:

- A. The EPA requires the Town to develop and implement a program to protect the public health and welfare by ensuring that all potable water distributed or sold to the public by public water systems is free from unwholesome, poisonous, deleterious, or other foreign substances, and filth or disease-causing substances or organisms. The Town's Water Resources Department is the Town Department authorized by Town Council to enforce provisions of Chapter 17 of the Town Code. Contact the Town's Water Resources Department for details and requirements of such Chapter.

3-3.008 MCESD Requirements:

- A. Policy:
1. MCESD is required to review and approve all public water main extensions and construction of water related facilities within the Town's service area, prior to the Town approving the final plans.
 2. In order to gain Town approval, i.e., Town Engineer's signature on a plan set:
 - a. The plans shall be signed and dated by MCESD approving the plans.
 - b. An executed copy of the MCESD approved "Certificate of Approval to Construct" shall be submitted with the plans at time of Town approval.
 3. Before the water system is accepted or put into service and prior to any issuance of a Certificate of Occupancy, the Developer/Landowner shall submit a Certificate of Approval of Construction signed by MCESD.

3-3.009 Implementation:

- A. The implementation and enforcement of the design standards set forth in this section shall be effective the date of Town Council's adoption of the resolution approving the standards and requirements of this section and shall apply to the following:



1. All new plans and reports submitted to the Town following the effective date of Town Council's adoption of the resolution approving the standards and requirements of this section.
2. All plans and reports seeking a new Town Engineer's signature or a re-approval from the Town Engineer.
3. All expired plans and reports shall be brought into conformance with the design standards of this section.
4. All plans and reports produced under an approved CMP shall follow or be brought into conformance with the design standards of this section.
5. All current approved plans that have not been permitted shall comply with the requirements of this section. Prior to the issuance of the construction permit, the design engineer shall submit a written letter to the Town Engineer acknowledging the construction and materials shall be performed and supplied pursuant to the requirements of this section.
6. All expired or abandoned plans and reports as defined below.
 - a. The Town will not hold or store plans and reports. Any plan set or report that has not been picked up from the Town within 90 days of the Town's first notification to the applicant that the plans are ready to be picked up will be deemed abandoned. The Developer/Landowner will be notified that the expired plan set or report will no longer be considered by the Town. If a plan or report is abandoned, the Developer/Landowner will be required to resubmit the abandoned plan or report and pay the Town all associated fees.
 - b. If a construction permit for the plans has not been issued within 1 year from the date of approval noted on the cover sheet, the plans and reports will be required to be resubmitted to the Town for review and re-approval.
 - i. In order to resubmit plans and reports, the design engineer shall bring the plans and reports into conformance of the Town's current standards and requirements.
 - ii. All revised plans and reports will be subject to the Town's current fee schedule.
 - iii. This resubmittal is required to go through a comprehensive review of the reports or all plan sheets.
 - c. If plans and reports have not been resubmitted to the Town for review or permitting within 2 years from the date of the last Town action the plans and reports shall be considered expired. Once a plan or report has expired, the plan shall be resubmitted for first review and all associated fees shall be paid to the Town.
 - i. In order to resubmit plans and reports, the design engineer shall bring the plans and reports into conformance of the Town's current standards and requirements.
 - ii. All expired plans and reports being resubmitted will be subject to the Town's current fee schedule.
 - iii. This new submittal is required to go through a comprehensive review of the reports or all plan sheets.

3-3.100 Tank Engineering Requirements:

3-3.101 Design requirements:

A. Tank Sizing Criteria:



1. Booster storage shall be sized for the ultimate build out service area for the booster station. Once the total storage is known then it can be broken into multiple storage tanks. A minimum of two tanks is required on all sites; these tanks shall be close in size.
2. The largest of the following is used for calculating the ultimate storage. All numbers used for the storage calculations shall be the ultimate build out numbers.
 - a. Peak Hour Storage – 4 hours Peak Demand without using more than 80% of total capacity without wells.
 - b. Fire Flow – 25% Max Day Demand + Required Fire Flow (4000 gpm x 4 hours = 960,000 gallons). See Section 3-1.202.C and Section 3-1 Table 3 Fire Flow in Section 3-1, Water Design Standards.
 - c. Operating Storage – 20% of total Max Day Demand.
 - d. Emergency Storage – Average Day Demand without using more than 80% of total storages without wells.
- B. Roof vent shall be properly sized for the fill rate of the tank. Vent shall be a security type vent Omega ARC3 or Town approved equal.
- C. Two (2) 30 inch roof manholes shall be approximately 180 degrees apart and have the following appurtenances:
 1. Hinged
 2. Outfitted with locking tabs for master style locks
 3. Require intrusion switches
 4. Lifting handle
 5. Provide an OSHA rated safety tie-off adjacent to each roof hatch
 6. Weather tight
- D. The tank shall have a full handrail around the perimeter of the roof. Handrail shall meet all OSHA and Town standards.
- E. Level indicator:
 1. Level indicator board shall be constructed of aluminum with graduations in feet and inches.
 2. The interior float shall be 316 stainless steel.
 3. Float cable and guild wires shall be stainless steel.
 4. All brackets and anchor bar shall be steel and coated with the same system as the interior of the tank.
 5. The target shall be steel and painted bright red.
 6. The sheave assembly:
 - a. Housing and cover shall be cast aluminum
 - b. The sheave shall be Delrin
 - c. All bearings shall be Teflon
 - d. Bearing shafts shall be stainless steel
 7. The guild wire housing assembly shall be galvanized steel with a steel spring.



8. Dielectric connections shall be specified where they exist with the tank shell.
- F. Over flow pipe:
 1. Over flow shall be sized one pipe size larger than calculated for the maximum day well pumping rate in 18 hours.
 2. Weir calculations shall be provided to ensure proper weir length for the 18 hour well pumping rate.
 3. Over flow shall be set no closer than 6 inches to the top of the sidewall and no lower than 1 foot from the top of the side wall. Usable tank storage volume calculations shall start at 1 foot below the overflow weir.
 4. Flap valves shall be used to seal the end of the overflow pipe.
- G. One (1) inside ladder is required, located at the same manhole as the exterior ladder.
 1. Exterior ladder shall be equipped with an OSHA approved climbing mechanism. This can be a Saf-T-climb or Town approved equal constructed out of 304 stainless steel.
- H. Two (2) entry man-ways are required. Each man-way shall be 36 inches in diameter. They shall be located 180 degrees apart.
 1. Man-ways shall be hinged with a hold open device and be able to lay 180 degrees open.
- I. One (1) flush cleanout is required per tank. Each flush cleanout shall be 48 inches in height and 36 inches in width. They shall be located in conjunction with the tank overflow.
- J. Exterior ladder and ladder safety barrel with side swing ladder security door.
 1. Exterior ladder shall be equipped with an OSHA approved climbing mechanism. This can be a Saf-T-climb or Town approved equal constructed out of 304 stainless steel.
- K. Inlet, sized for the 18 hour maximum well pumping rate.
 1. Inlet shall be located approximately 40 feet up stream from a manhole.
 2. Inlet shall enter the tank perpendicular to the wall and then have a 90 degree elbow installed. The 90 degree elbow shall be aimed 30 degrees above the horizontal.
- L. An 8 inch shell penetration shall be center located one foot above the bottom of the side wall. This penetration shall be used for level transducers.
 1. This penetration shall have a standard flange connection.
 2. The blind flange shall have two (2), 1 ½ inch couplings installed in the center of the blind flange. Couplings shall be configured so as when the blind flange is bolted on the couplings at level and centered 1 foot from the bottom of the tank. Blind flange shall be steel and not a dissimilar metal from the tank.
- M. Corporation stops shall be used in all tank penetrations 3 inches and smaller. Corporation stops shall be specified as a ball style or Town approved equal.
- N. Tank penetrations larger than 3 inches shall be made as a flange connection. All flange style connections shall have a valve installed immediately on the tank flange.
- O. Prior to any piping going into the ground, a restrained flexible rubber arch connection allowing vertical and horizontal movement shall be installed.
- P. The tank shall be equipped with dual level transducers for redundancy. If more than one (1) reservoir is to be in operation on site, all reservoirs shall be equipped with dual level transducers.



- Q. Grounding lugs shall be located per the Electrical Engineer's requirements.
- R. Concrete ring walls shall be used for all tanks.
- S. Tanks shall be orientated such that the exterior ladder, manhole with interior ladder, level indicator and level transducer are visible from the entrance drive and pump building.
- T. The flush cleanout tank drain and overflow shall be located where they are captured by a catch basin and piped in a storm drain to the nearest retention basin or Town approved outfall.
- U. Tank shall be sized for working volume. Working volume is defined as a water surface elevation 1 foot below the tank overflow and 6 inches above the lowest point to which the tank can be pumped down without vortexing at the suction piping in the tank, pumps losing suction or a elevation that does not meet the net positive suction of the pumps. The tank volume required in the master plan for this service area shall be provided in between these two (2) elevations.
- V. A top view of the tank with radial locations of all items is required, North being 0 degrees. A flattened view of the side wall showing all locations of items is also required, North being 0 degrees.
- W. All locations where a dielectric connection could or will exist shall be designed to eliminate this type of connection. Example: specify clear flow nipples on locations where corporation stops are being used in couplings.
- X. Handrails are required around the perimeter of the tank:
 - 1. All handrails per [TOB Detail 33240-1 and 33240-2](#).
- Y. All storage tanks shall be constructed to the nearest one-half million gallons working volume capacity; with one-half million gallons being the minimum tank capacity in accordance with the Town of Buckeye's Water Master Plan.
- Z. Adjacent to the concrete ring wall, a 3 foot wide concrete pad shall be constructed per MAG Detail 230 for sidewalks. The top of the concrete pad will be 0.5 feet below the top of the concrete ring wall and slope away at 1.5%. Due to extreme grading, (slopes in excess of 4:1) this concrete pad may be extended to protect those slopes.
- AA. All tanks shall have cathodic protection.

3-3.200 Steel Water Storage Reservoir Requirements:

3-3.201 Design Requirements (Tank Requirements):

- A. Design Loads:
 - 1. Live load of 15 pounds per square foot.
 - 2. Wind load shall be calculated using a 100 mph, Exposure "C" and calculated per the Town adopted version of the IBC.
 - 3. Seismic Load:
 - a. Meet requirements of ANSI/AWWA D100, most current edition.
 - 4. Foundations shall be designed per the approved geotechnical report.
 - a. Specific soil samples are to be taken within the area to be covered by the tank.



- B. Concrete ring wall design shall be done using the soil characteristics within the geotechnical report. The [TOB Detail 33310-1](#) and [33310-2](#) are a minimum that shall be verified by the engineer.
- C. Concrete ring wall shall have a minimum of a double mat of circumferential steel.
- D. Tank accessories shall be the type and construction as specified in Section 7 of AWWA D100 and as detailed on the construction plans.
- E. The design of access manholes, clean outs and penetrations shall conform to the requirements in Supplement 1 of the American Petroleum Institute Standard 650, latest edition.
- F. Tank rafters shall be braced adequately to prevent bowing or twisting.
- G. Column base plates shall be designed for the maximum allowable soil bearing pressure as stated in the geotechnical report.
- H. The center column shall not be welded to the floor. Under the center column support in addition to the tank floor, a 3/16 inch wear plat is required. The wear plat shall be designed to be 6 inches past all drift angles. The wear plate perimeter shall be 100% welded to the floor.
- I. Tank shall be fitted with a name tag. The name tag shall have the following minimum information:
 - 1. Edition
 - 2. Year Complete
 - 3. Section
 - 4. Nominal Diameter
 - 5. Nominal Height
 - 6. Nominal Capacity
 - 7. Specific Gravity
 - 8. Manufactures W.O. #
 - 9. Tank Manufacture's Name

3-3.202 Submittals:

- A. A minimum of four (4) copies are required for Town review and approval.
- B. Shop drawings, calculations, and certificates:
 - 1. Submittals shall be submitted to the Town for review and approval for all of the following items. All designs and calculations shall be sealed by a Professional Structural Engineer Registered in Arizona.
 - a. Design drawings of all steel fabrication including erection drawings.
 - b. Ring wall design calculations.
 - c. Complete design calculations for the tank including the seismic analysis calculations.
- C. Quality Control Submittals:
 - 1. Test Reports:
 - a. Mill tests on steel tank plates

- b. Mill tests on structural steel
 - c. Certified weld inspection reports
- 2. Credentials and Statements of Qualifications:
 - a. Tank designer
 - b. Tank manufacturer
 - c. Tank installer
 - d. Welder / welder operator
 - e. Weld testing agency
 - f. Welding inspector, (if not supplied by the Town)
- 3. Welding Documentation:
 - a. Shop and field welding procedure, specifications and supporting welding procedure qualification records.
 - b. Nondestructive weld testing procedure specifications, (if not being performed by the Town).
- D. Manufacture's statement of responsibility.
- E. Film Documentation of X-ray testing shall be submitted.
- F. Cathodic protection system:
 - 1. Shop drawings
 - 2. Catalog data
 - 3. Installation instructions
 - 4. Calculations
- G. Catalog data.
- H. Thermal stress relief report for all items treated.
- I. Security roof vent.

3-3.203 Materials:

- A. Concrete:
 - 1. All concrete shall be a minimum of MAG Class AA (4000 psi).
- B. Steel:
 - 1. The tank roof shall have a minimum thickness of 3/16 of an inch.
 - 2. The tank wall shall have a thickness designed according to and based upon AWWA D100. In no case shall the wall thickness be less than 1/4 of an inch.
 - 3. The tank floor shall have a minimum thickness of 5/16 of an inch.
 - a. The floor shall have a pitch of 2% towards the perimeter of the tank.
 - 4. Tank accessories shall be the type and construction as specified in Section 7 of AWWA D100 and as detailed on the construction plans.

C. Tank Base:

1. Base material shall be tested for corrosivity according to AWWA.
2. MAG ABC or #57 rock are acceptable base materials.

3-3.204 Fabrication:**A. General:**

1. All fabrication per ANSI / AWWA D100.
2. All steel shall be shop bent to radius shown.

B. Tolerances:

1. Plumbness: Top of tank maximum 1/200 of height above ground.
2. Roundness: Radii measured at 1 foot above bottom corner weld have the following maximum tolerances:

Table 1 Maximum Roundness Tolerances

Diameter (Feet)	Radius Tolerance (Inches)
≤ 40	Plus or minus 6
40 to 150	Plus or minus 9
150 to 250	Plus or minus 12
≥ 250	Plus or minus 15

3. Peaking and Banding at Welded Joints:
 - a. Maximum one 1/2 inch peaking using a horizontal sweep board 36 inches long.
 - b. Maximum one 1/2 inch banding using a vertical sweep board 36 inches long.
4. Local Flat Spots: On cylindrical sections, measured in the vertical plane, maximum plate flatness and waviness requirements in ASTM A690a and ASTM A2091.
5. Offset of aligned shell courses: Accurately adjoin edges of butt joints and retain in position during welding. Offset tolerances are as follows:

Table 2 Offset Tolerances

Plate Thickness (t) (Inches)	Subject to Primary Stress (inches)	Subject to Secondary Stress (Inches)
0 to 1/2	1/8	1/4t
1/2 to 3/4	1/8	1/4t
3/4 to 1 1/2	1/8	3/16t
1 1/2 to 2	1/8	1/8t
Over 2	Lesser of 1/16t or 3/8	Lesser of 1/8t or 3/4t

C. Welding:

1. General:
 - a. Shall be per AWWA D100, Section 8.
2. Roof: flat or single curved shall be double fillet welded.
3. Shell:



- a. Complete penetration butt joint welds on circumferential and vertical joints.
 - b. Openings shall be groove or fillet welded.
 - c. Provide post weld heat treatment of all complete penetration welds in material 1 ¼ inch or thicker.
4. Floor:
- a. Floor plates to be fillet welded.
 - b. Openings shall be groove or fillet welded.
5. Accessories and attachments:
- a. Joints: seal welded as a minimum.
 - b. Piping: fillet welded or as detailed.
 - c. Anti vortex plate: seal welded or as detailed.
 - d. Flush cleanout: welded as detailed but shall be constructed in one piece and the entire piece stress relieved per AWWA.
6. Columns shall be cap welded at both ends.

3-3.205 Field Quality Control:

- A. Weld Nondestructive Testing:
1. Visual inspection by certified welding inspector of all welds for acceptance in accordance with standards set forth in ANSI/AWS D1.1-94, paragraph 8.15.1, unless more stringent NDT is required in this Specification section.
 2. Roof: Magnetic particle test at 10% rate per ANSI/AWS D1.1-94, paragraph 8.15.5.
 3. Shell: Spot radiographically examine per ANSI/AWWA D100, Sections 11.5 and 11.6.
 - a. Openings:
 - i. Test per API 650.
 - b. Connection to Floor: 25% magnetic particle test per ANSI/AWS D1.1-94.
 4. Floor Opening Welds: 100% vacuum test for floor welds.
- B. Vacuum test welded flat bottom and hydro test tank in accordance with ANSI/AWWA D100-96, Section 11.12, except perform hydro test after painting is complete.

3-3.206 Welded Steel Reservoir Painting and Coating

- A. Outside Coating System:
1. This system consists of a two-component epoxy prime and a two-component aliphatic polyurethane finish coat. All exterior surfaces shall be coated with this system.
 2. This system provides very good color and gloss retention and is also highly abrasion resistant to windblown debris. The system can generally be applied by spray, brush, or roller. The polyurethane finish coat is generally graffiti resistant in that selected solvents or commercial cleaners can usually be used to remove graffiti from the surface without damaging the completely cured urethane finish coat.



3. The addition of an optional second finish coat consisting of a clear aliphatic polyurethane coating containing UV absorbers can further enhance the long-term color and gloss retention of this system. The clear coat is a particularly useful option to enhance the color and gloss retention of bright-colored logos on tank exteriors. The coating manufacturer should be consulted for clear-coat-application parameters and film-thickness requirements.
 4. Minimum 4.0 to 7.0 mil dry film thickness total.
- B. Inside Coating System:
1. This is a three-coat organic zinc-rich primer, two-component epoxy intermediate and two-component epoxy finish coat system. All interior surfaces are to be coated with this system.
 2. The zinc-rich primer provides improved corrosion protection compared to a barrier-type prime coat. To obtain curing with some two-component epoxy products, surface and ambient temperatures of 50°F (10°C) and higher are required.
 3. Two-component epoxy products are available with factory-applied accelerators (or packaged separately) that allows curing below 50°F (10°C). Consult manufacturer's recommendation for minimum and maximum temperature requirements. All accelerators shall be approved by the Town prior to use.

Table 3 Paint Schedule

	Exterior (DFT)	Interior Walls (DFT)	Interior Floor (DFT)
Blast	SP6	SP10	SP10
Prime color	4.0 – 6.0 1255 Beige, N140 or V140	2.5 – 3.5 Green-Gray Series 94 H ₂ O	2.5 – 3.5 Green-Gray Series 94 H ₂ O
Intermediate Color	N/A N/A	4.0 – 6.0 1255 Beige, N140 or V140	6.0 – 8.0 1255 Beige, N140 or V140
Finish Color	3.0 – 5.0 Desert Sands, 1075 & 1075U	4.0 – 6.0 15BI Tank White, N140 or V140	6.0 – 8.0 15BI Tank White, N140 or V140
Total	7.0 – 11.0	10.5 – 15.5	14.5 – 19.5
Minimum	7.0	13	17

All paint specified is for reference see the materials section for additional information.

3-3.207 Submittals:

- A. A minimum of four (4) copies are required for Town review and approval.
- B. Manufacturer's statement regarding applicator qualifications.
- C. Applicator experience qualifications.
- D. Approval of application equipment.
- E. Painter's daily record.
- F. Manufacturer's recommendation for universal barrier coat.
- G. Shop Drawings:
 1. Product technical data including:
 - a. Acknowledgement that products submitted meet requirements of standards referenced.
 - b. Manufacturer's application instructions.
 - c. Manufacturer's surface preparation instructions.

- d. Manufacturer's factory-applied finish information.
 - e. Contractor's or applicator's written plan of action for containing airborne particles created by blasting operation and disposal location for spent contaminated blasting media.
 - f. Coating manufacturer's recommendation on abrasive blasting.
2. Certification:
 - a. Coating manufacturer's written approval of applicator's application equipment.
 - b. Certification that interior painting system is approved for use in potable water in accordance with NSF Standard 61.
 3. Samples:
 - a. Manufacturer's full line of colors for color selection by Town.
 - b. After initial color selection by Town, provide two (2) - 3 by 5 inch samples of each color selected.
 4. Material Safety Data Sheets:
 - a. For information only.
 - b. Town's Authorized Representative will not review and approve.
 5. Prior to starting work, Contractor shall submit complete fire response plan including at a minimum:
 - a. Location, type and size of all portable fire extinguishers on site during construction.
 - b. Entrance to site capable of accommodating local fire response vehicles.
 - c. Location of portable breathing apparatus.
 - d. Location of stored combustible and explosive materials.
 - e. Proposed construction schedule.
 - f. Submit plan for approval to local fire authority having jurisdiction over area in which work is occurring. Plan shall be submitted to the Town's Authorized Representative for approval.

3-3.208 Execution:

- A. Items to be painted:
 1. Exposed above-ground exterior surfaces including:
 - a. Piping, valves, fittings and appurtenances.
 - b. Conduit and appurtenances.
 - c. Surfaces of ferrous metal tankage.
 2. Interior Surfaces:
 - a. Piping, valves, fittings and appurtenances.
 - b. Surfaces of ferrous metal tankage.

- c. Surfaces of ferrous metal tank supporting structure, roof trusses/beams and miscellaneous ferrous metal surfaces.

3-3.209 Preparation:**A. General:**

1. Extent of surface preparation:
 - a. Interior and Exterior: Abrasive blast 100% of surface area.

B. Surface Preparation: Abrasive Blasting:

1. Interior surfaces and all appurtenances shall be blast cleaned to SSPC SP-10 (near-white).
2. Exterior surfaces and all appurtenances shall be blast cleaned to SSPC SP-6 (commercial).
3. Schedule the abrasive blasting operation so blasted surfaces will not be wet after blasting and before painting.
4. Prior to applying prime coat, re-blast surfaces allowed to set overnight or surfaces that show rust bloom.
5. Profile depth of blasted surface: Not less than 1 millimeter or greater than 2 millimeters unless directed otherwise by coating manufacturer.
6. Provide compressed air for blasting that is free of water and oil. Provide accessible separators and traps.
7. Protect nameplates, valves stems, rotating equipment, motors and other items that may be damaged from blasting.
8. Re-blast surfaces not meeting requirements of these Design Standards.
9. Properly dispose of blasting material which has been contaminated with debris from blasting operation.
10. Confine blast abrasives to area being blasted.
 - a. Provide shields of polyethylene or other such barriers to confine blast material.
 - b. Plug pipes, holes or openings before blasting and keep plugged until blast operation is complete and residue is removed.
11. Protect surrounding surfaces not to be blasted.
12. Remove and protect hardware, accessories, plates, fixtures and similar items, or provide ample in-place protection.
13. Type of abrasive shall be approved in writing by the paint manufacturer. Acceptable abrasive maximum particle size shall be no larger than that passing through a No. 16 US Standard Sieve. The largest commercial grade of metal grit permitted by the Specification is SAE #G-25 abrasive material.
 - a. Abrasives containing silica sand shall not be used.
14. The surface shall be cleaned by vacuum to remove any traces of blast waste from the surface and from pockets and corners.
15. After blasting operation has been completed the Town's Authorized Representative shall inspect all surfaces to identify areas of corrosion and/or pitting which need repair or replacement.



- a. Repair surfaces as required in accordance with AWWA D100.
- b. All welding shall be done by AWS certified welders in accordance with AWS D1.1.

3-3.210 Application:**A. General:**

1. Interior coatings shall be applied by conventional or airless sprayer. Exterior coating may be applied by brush, roller or airless sprayer.
2. Thin, mix and apply coatings in accordance with manufacturer's installation instructions.
 - a. Application equipment must be inspected and approved in writing by coating manufacturer.
3. Temperature and weather conditions:
 - a. Do not paint surfaces when surface temperature is below 50°F or when surface is less than 5°F above dew point.
 - b. Do not paint surfaces when surface temperature exceeds 125°F.
 - c. Do not paint on damp surfaces.
4. Provide complete coverage to millimeter thickness specified.
 - a. Thickness specified is dry millimeter thickness.
 - b. All paint systems are "to cover." In situations of discrepancy between manufacturer's square footage coverage rates and mil thickness, mil thickness requirements govern.
 - c. When color or undercoats show through, apply additional coats until paint film is of uniform finish and color.
5. Do not apply consecutive coats until Town's Authorized Representative has had an opportunity to observe, check thickness and general appearance of previous coats.
6. Apply materials under adequate illumination.
7. Evenly spread to provide full, smooth coverage.
8. Work each application of material into corners, crevices, joints and other difficult to work areas.
9. Avoid degradation and contamination of blasted surfaces and avoid inter-coat contamination.
 - a. Clean contaminated surfaces before applying next coat.
10. Smooth out runs or sags immediately, or remove and re-coat entire surface.
11. Allow preceding coats to dry before re-coating.
 - a. Re-coat within time limits specified by coating manufacturer.
12. Allow coated surfaces to cure prior to allowing traffic or other work to proceed.
13. Surface to be painted shall be free of airborne dust.
14. Provide adequate ventilation in accordance with 29 CFR 1910.94.
15. Provide worker personal protective equipment in accordance with 29 CFR 1910.132 through 1910.137.

**B. Prime Coat Application:**

1. Prime all surfaces indicated to be painted. Apply prime coat in accordance with coating manufacturer's written instructions and as written in this Section.
2. Apply primer to abrasive blasted surface as near as practical to the day the surface is blasted and before rust bloom occurs.
3. Ensure abrasive blasting operation does not result in embedment of abrasive particles in paint film.
4. Brush or spray bolts, welds, edges and difficult access areas with primer prior to and after primer application over entire surface.
5. Touch up damaged primer coats prior to finish coats. Restore primed surface equal to surface before damage.

C. Finish Coat Application:

1. Apply finish coats in accordance with coating manufacturer's written instructions and as written in this Section.
2. Touch up damaged finish coats using same application method and same material specified for finish coat. Prepare damaged area as specified herein.
3. Finish coat shall be applied within the manufacturer's recommended re-coating period for both the primer and finish coats.

3-3.211 Quality Assurance and Inspection:

- A. Contractor will employ services of an independent NACE level III Inspector, hereafter referred to as "Inspector."
 1. Inspector will be responsible for witnessing, verifying, inspecting and documenting the coating work.
 2. Inspector will maintain a daily record of all information.
 3. All work and materials shall be accessible to the Inspector and the Town's Authorized Representative.
 4. Profile readings, wet film thickness readings and dry film thickness readings shall be taken at 45-degree intervals around the tank's circumference, every 5 feet in height in a staggered manner. Readings shall be taken for both interior and exterior of tank. Readings on appurtenances shall be taken at a minimum of five (5) locations each, in a random manner.
 - a. Wet film thickness readings shall be taken by the applicator and witnessed by the inspector.
 - b. Dry film thickness readings shall be conducted in accordance with SSPC-PA-2.
 - c. All thickness gages and micrometers used for inspection purposes shall be calibrated daily in accordance with SSPC-PA-2.
 5. Measure surface temperature of items to be painted with surface temperature gage specifically designed for such.
 6. Determine dew point with humidity gage specifically designed for such work.

- B. Contractor shall prevent spent abrasive or blast waste from collecting on surrounding buildings, vegetation, walkways, soil, equipment or structures.
- C. Dry paint films showing sags, checks, blisters, teardrops, runs, etc., will not be accepted. Defects shall be completely removed, surface re-prepared and re-coated in accordance with paint manufacturer's recommendations at no additional cost to Town.
- D. Contractor shall conduct holiday tests on all interior surfaces. Contractor shall notify Town's Authorized Representative 48 hours prior to conducting holiday test procedure. Town's Authorized Representative and Inspector will be present during holiday testing.
 - 1. Holiday testing shall be done using equipment specifically designed for such and shall be conducted in accordance with applicable SSPC requirements.
 - 2. Contractor shall mark all holidays with non-grease type marker.
 - 3. All holidays shall be repaired in accordance with paint manufacturer's recommendations and retested at Contractor's expense.
 - 4. Acceptance of test, procedures, surface or equipment by the Inspector shall not relieve the Contractor of his responsibility to comply with the requirements of this Section and all applicable codes or requirements.
 - 5. All holiday testing shall be done with high voltage testing equipment.
- E. Contractor shall provide wet paint signs.

3-3.212 Reservoir Testing and Disinfection:

- A. Testing:
 - 1. Upon completion of all construction work outlines in the Plans and Specification, and after all cleanup is satisfactorily completed, the Contractor shall furnish such labor and equipment as may be required, and fill the reservoir with water. The Contractor shall furnish the water for testing the reservoir. During construction, the testing shall be performed in accordance with AWWA Standard D100.
 - 2. The Reservoir shall show no leakage when filled with water. Should the reservoir show leakage it shall be drained and the leak repaired. Special consideration shall be given to protecting the exterior and interior surfaces during repairs, and they shall be repaired to the satisfaction of the Town.
 - 3. To ensure that volatile organic and coliform bacteria concentrations are within acceptable limits, the following testing procedure shall be followed:
 - a. Following the filling of the reservoir, all valves shall be closed to prevent the transfer of water to the distribution system. A five (5) day soaking period shall follow the initial filling.
 - b. At the end of said five (5) day period, samples of water will be recovered by the Contractor in accordance with the latest ADEQ standards. Samples shall be forwarded by the Contractor to a certified laboratory for determination of volatile organic concentrations and coliform bacteria.
 - c. If the volatile organic or coliform bacteria levels exceed those allowed by ADEQ, the tank contents shall be drained to waste. The tank shall be refilled at the Contractor's expense (including the cost of water), soaked, and retested for coliform bacteria and volatile organics until satisfactory test results are obtained. Failure of the reservoir to



attain acceptable levels of coliform bacteria and/or volatile organics shall be the responsibility of the Contractor and remedial measures to attain acceptable levels shall be at his expense.

- d. All water samples that exceed the allowable levels of volatile organic or coliform bacteria shall be reported by the Contractor. The tank shall remain out of service until the corrective actions described above are taken and additional samples indicate that volatile organic and coliform bacteria levels are within acceptable limits.
 - e. The Contractor shall submit all documentation required by ADEQ and the Town indicating, at minimum, all test results and the date the tank was placed in service. Three (3) copies of the report shall be submitted to the Town.
 - f. Fees for all laboratory analysis shall be borne by the Contractor.
4. Testing shall be completed and all repairs made to the satisfaction of the Town before the work is accepted.
 5. Any test water required to be removed from the reservoir at the direction of the Town shall be the responsibility of the Contractor who shall furnish the necessary labor, tools, and equipment, including pumps, to properly dispose of the water.

B. Disinfection:

1. Disinfection of interior surfaces shall be performed in the presence of the Town in accordance with ANSI/AWWA Standard C652-92 and Chlorination Method 1 per ADEQ Bulletin 8 as modified herein.
2. Disinfection shall be performed after protective coating has been applied to the interior surfaces and cured in accordance with the requirements of the manufacturer's specifications or the Town's whichever are more stringent.
3. Prior to disinfecting, the complete interior shall be cleaned by hosing with clean water and thoroughly flushed out. This operation shall be performed after the interior coatings have cured as directed by the Town.
4. After completion of cleaning and flushing, the interior surfaces shall be jet washed with a chlorine solution having a content of 200 P.P.M. Chlorine solution which accumulates on the bottom shall be drained to waste or disposed of in a manner acceptable to all cognizant agencies. Rinsing with clean water is not required.
5. After testing has been completed in accordance with this Section and prior to the reservoir being placed into service, the chlorine residual shall not be less than 1.0mg/l nor greater than 2.0mg/l.

C. Disposal of Test Water:

1. All water used in testing and disinfecting the reservoir, including that used for retesting, shall be disposed of following such testing, retesting and disinfecting by the Contractor at his sole expense.
2. If required by the Town, the contractor shall apply a reducing agent to the solution to neutralize residual chlorine or chloramines remaining in the water prior to disposal. The disposal of water shall, in all cases, be carried out in strict observance of the water pollution control requirements of the applicable agencies. The flow of water from the reservoir shall be controlled to prevent erosion of surrounding soil, damage to existing roads, vegetation, irrigation ditches and altering of ecological conditions in the area.



3-3.300 **Plan Preparation:**

3-3.301 **General Requirements:**

- A. All plans shall comply with "Design Standards - Section 1-2 Plan Submittal Requirements" General Construction Notes and Standard Sheets for Infrastructure Plan Submittals.

3-3.302 **Design Plan Requirements:**

- A. All plans shall be neat and legible.
- B. All plans shall be drawn to scale.
 - 1. Horizontal scale shall not be smaller than 1:10 feet on plan views.
 - 2. Vertical scale shall not be smaller than 1:2 feet on profile views unless otherwise approved by the Town Engineer.
- C. Plans shall have only one plan and profile per sheet.
- D. Tank design is the only design allowed on the tank plans, no other utility designs allowed.
- E. Plans shall not be phased.
- F. All design shown shall be constructed under one permit and construction sequence.
- G. See TOB Details in [Appendix 1](#).

3-3.303 **Submittal Requirements:**

- A. Plan Review Submittals:
 - 1. The tank plans shall be part of the overall booster system if it is being constructed at the same time as the tank. If the tank is being constructed on its own then the tanks and associated plans can be packaged together.
 - 2. In addition to bond copies, a CD with the following items is required to accompany the plans submitted for signature to the Town:
 - a. Base map for the area on the plans seeking approval including all property lines, ROW, PUEs, easements etc.
 - b. All the information shall be shown on a single map, not cut sheets like the plans and located on reasonable layers in CAD.
- B. Plan Revisions or Re-Approvals:
 - 1. Town approval of plans and associated design reports are valid for one (1) year from the date of the Town Engineer's signature.

3-3.304 **Town of Buckeye Permit:**

- 1. The Developer/Landowner shall secure a permit from the Town for constructing all tanks.
- 2. If a revised plan set is submitted, approved, and signed then the Developer/Landowner is responsible for securing a revised permit from the Town.

3-3.305 **Materials/Shop Drawings:**

- A. All materials in contact with water shall meet and be certified per the requirements of NSF-61.

**B. Submittals:**

1. All materials used on the development or incorporated into the construction are subject to approval or rejection by the Town Engineer.
2. All shop drawings and associated calculations shall be submitted for review and approval by the Town.
3. All delivered materials shall match the approved technical data or it will be rejected.
4. The contractor shall submit four (4) copies of the submittals/shop drawings to the Town.
5. All work installed prior to approval of submittals/shop drawings is subject to rejection by the Town.
6. A copy of the approved material submittals/shop drawings shall be on the jobsite at all times.
7. Each of the submittal/shop drawing shall clearly show the manufacturer and have comprehensive technical data for the proposed product.
8. All material submittals/shop drawings shall be submitted at or before the pre-construction meeting for review and approval by the Town Engineer. For items not being able to be submitted at the pre-construction meeting they shall be submitted a minimum of 20 Town working days prior to the construction of the item being submitted in order to give the Town adequate time to review and approve.

C. Tank Base Material:

1. Base material shall be MAG ABC per MAG section 702. ABC shall meet all corrosivity requirements per AWWA for being in contact with the tank.
2. Crushed #57 rock is also acceptable for tank base material.

D. Gate Valves:

1. Shall be ductile iron in accordance with ANSI/AWWA.
2. Shall be resilient wedge gate valves.
3. Shall be epoxy coated.
4. Shall have a minimum working pressure of 250 psi.

E. Fittings:

1. All fittings shall be ductile iron in accordance with ANSI/AWWA.
2. For standard use fittings 3 through 24 inch shall be rated for 350 psi working pressure.
3. For standard use fittings 30 through 48 inch shall be rated for 250 psi working pressure.
4. All fittings shall be cement lined per ANSI/AWWA.

F. Paint:

1. Interior prime coat shall be TNEMEC Hydro-Zinc Series-H₂O or Town approved equal.
2. Interior intermediate coat, finish coat, and exterior prime coat shall be TNEMEC Pota-Pox Plus N140 or V140 or Town approved equal.
3. Exterior finish coat shall be TNEMEC Endura-Shield II 1075 & 1075U or Town approved equal.



3-3.400 As-Built Drawings:

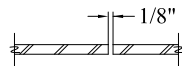
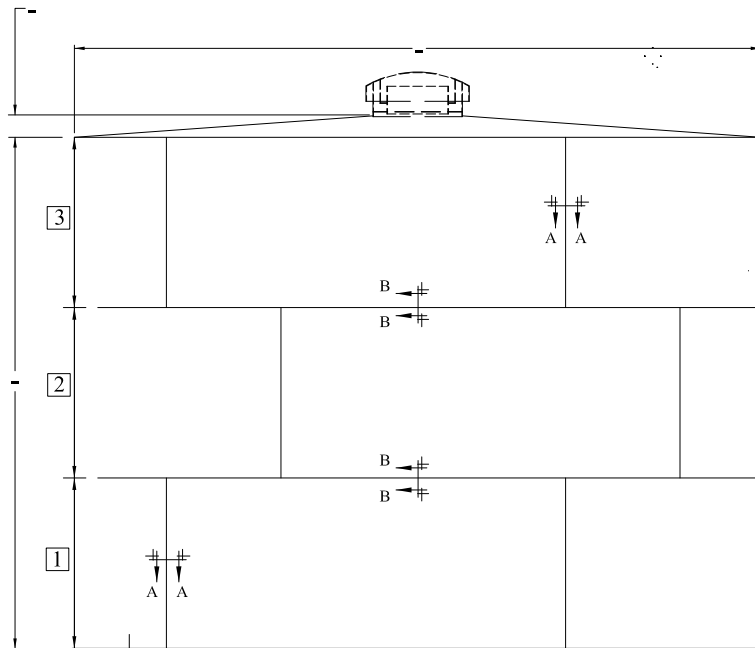
3-3.401 General Requirements:

- A. All As-Built drawings shall comply with “Design Standards - Section 1-2 Plan Submittal Requirements.”
- B. Final As-Built Drawings (only Final As-Built are required):
 - 1. All elevations on the plans shall be As-Built.
 - 2. All dimensions on the plans shall be As-Built.
 - 3. All items to be constructed in the tank shall be As-Built.

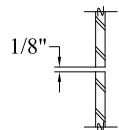
[END OF SECTION]

Appendix 1 Standard Details

33200	Tank General Information – 1
33200	Tank General Information – 2
33210	Dollar Plate and Rafter Clips
33212	Rafters
33214	Center Post Support
33220-1	30" Shell Manway – 1
33220-2	30" Shell Manway – 2
33226-1	30" Roof Manhole – 1
33226-2	30" Roof Manhole – 2
33226-3	30" Roof Manhole – 3
33230-1	Outside Ladder – 1
33230-2	Outside Ladder – 2
33232-1	Ladder Door, Clockwise – 1
33232-2	Ladder Door, Clockwise – 2
33232-3	Ladder Door, Clockwise – 3
33232-4	Ladder Door, Clockwise – 4
33236	Inside Ladder
33240-1	Handrail – Welded, Top of Tank – 1
33240-2	Handrail – Welded, Top of Tank – 2
33250	Flanged Tank Connection
33256-1	36" x 48" Flush Cleanout with Drain – 1
33256-2	36" x 48" Flush Cleanout with Drain – 2
33260-1	Water Draw – Sump – 1
33260-2	Water Draw – Sump – 2
33262	Water Drain – Undertank
33270-1	Overflow – 1
33270-2	Overflow – 2
33282	Inlet – Topfill
33290-1	Cathodic Protection Tank Details – 1
33290-2	Cathodic Protection Tank Details – 2
33294	Roof Vent
33296	Grounding Lugs
33310-1	Concrete Ringwall – 1
33310-2	Concrete Ringwall – 2



Section A-A



Section B-B

GENERAL NOTES

1. MATERIALS:

- A. PLATE AND STRUCT - A36
- B. PIPE - A53B OR A53A
- C. WELD FITTINGS - A234
- D. COUPLINGS - A105
- E. BOLTS AND NUTS - A307B

2. BOLT HLS TO STRADDLE CENTER LINES

Sandblast and Paint Schedule

Interior

- Blast -
- Prime -
- Finish -

Exterior

- Blast -
- Prime -
- Finish -

Please select color from Tnemec Color Card

Dimensions Measured on Outside of Tank Shell

5'- 11"
MEASURED ON OUTSIDE
OF TANK SHELL

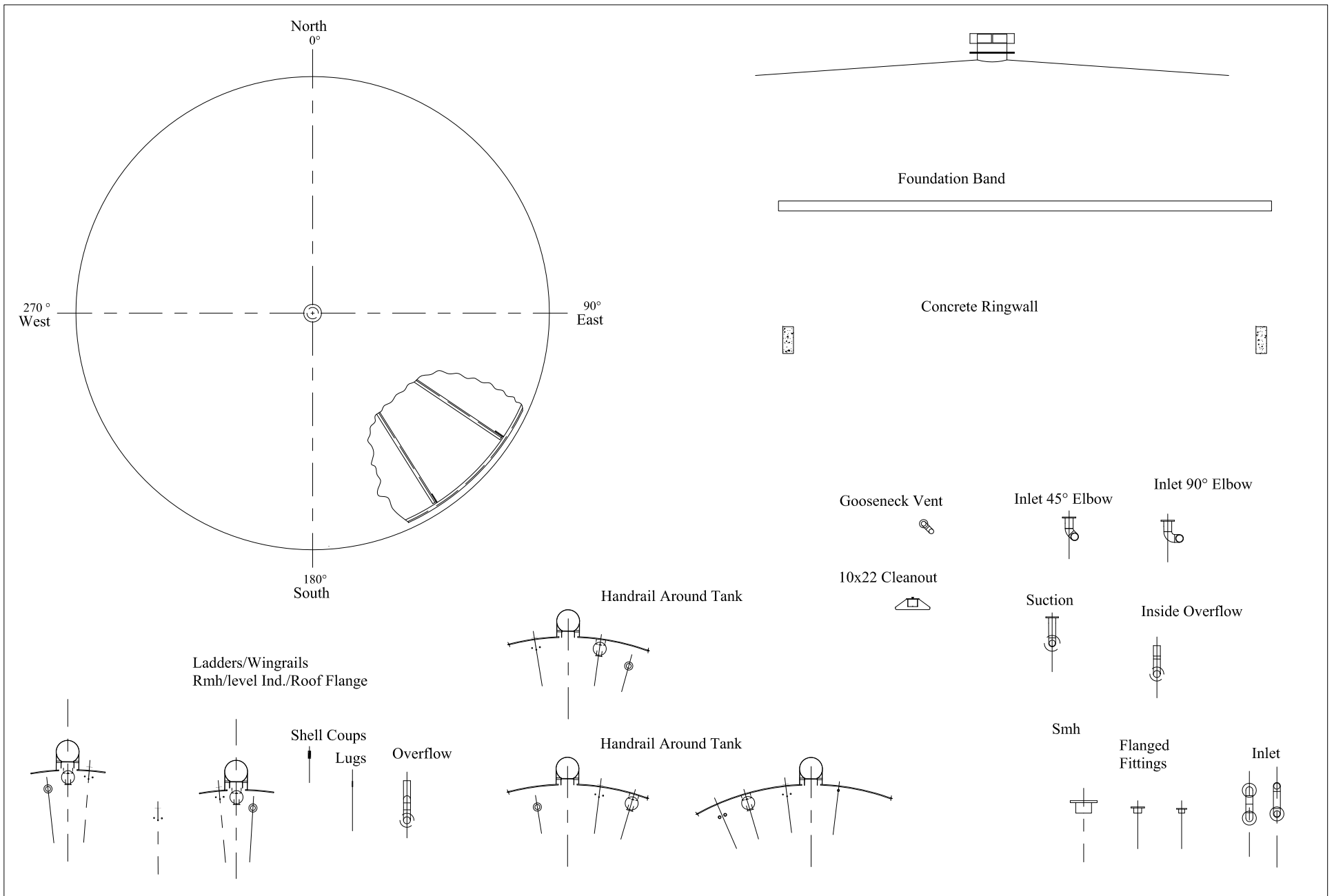
DESIGN AND TESTING

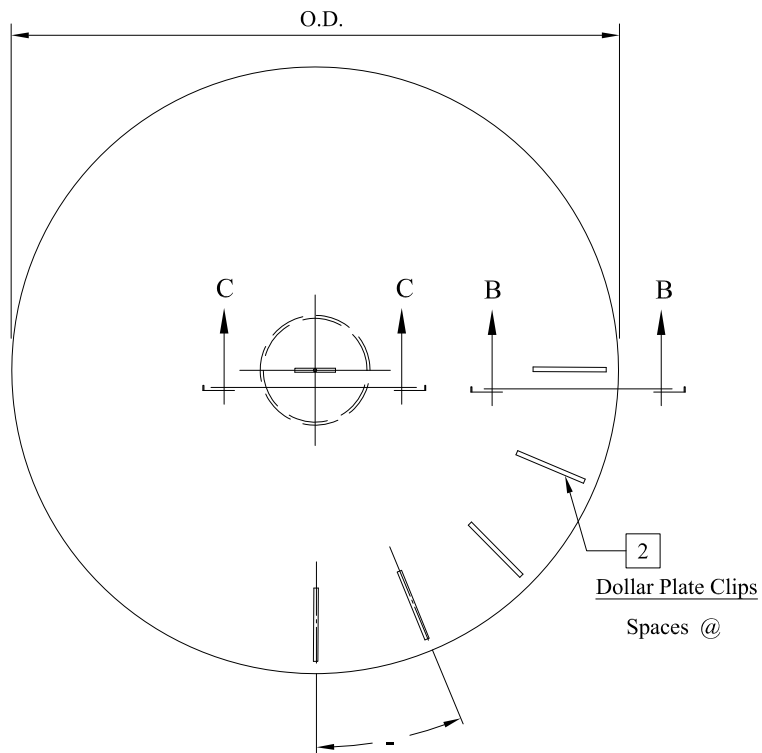
- 1. TANK TO BE DESIGNED, BUILT AND TESTED PER
- 2. ROOF LIVE LOAD PSF
- 3. X - RAYS
 - A. VERTS
 - B. ROUND
 - C. JUNCTIONS

Shell Sheets			
Course	Mtl. Size	Roll Rad	Stretch
1			
2			
Total Weight:			

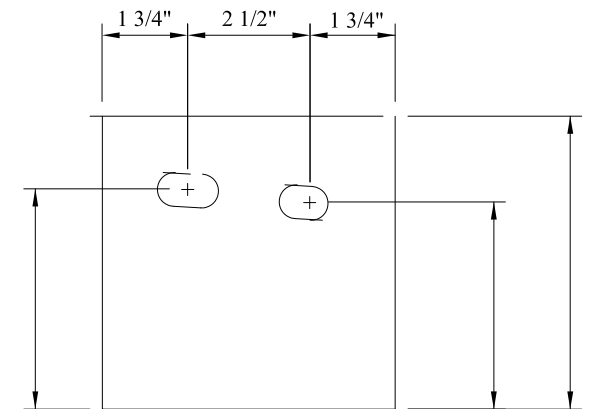
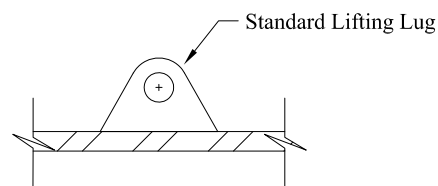
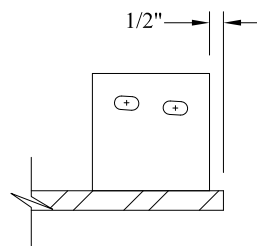
Legend		
Item	Description	Page
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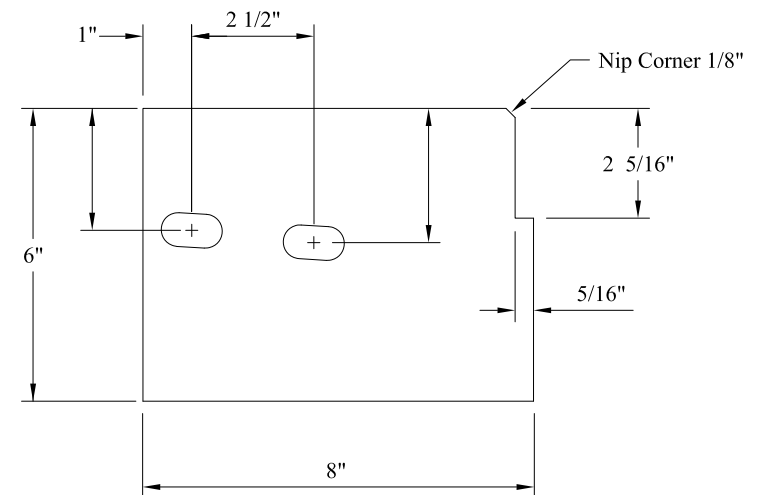


1 **Dollar Plate**



2 **Dollar Plate Clips**

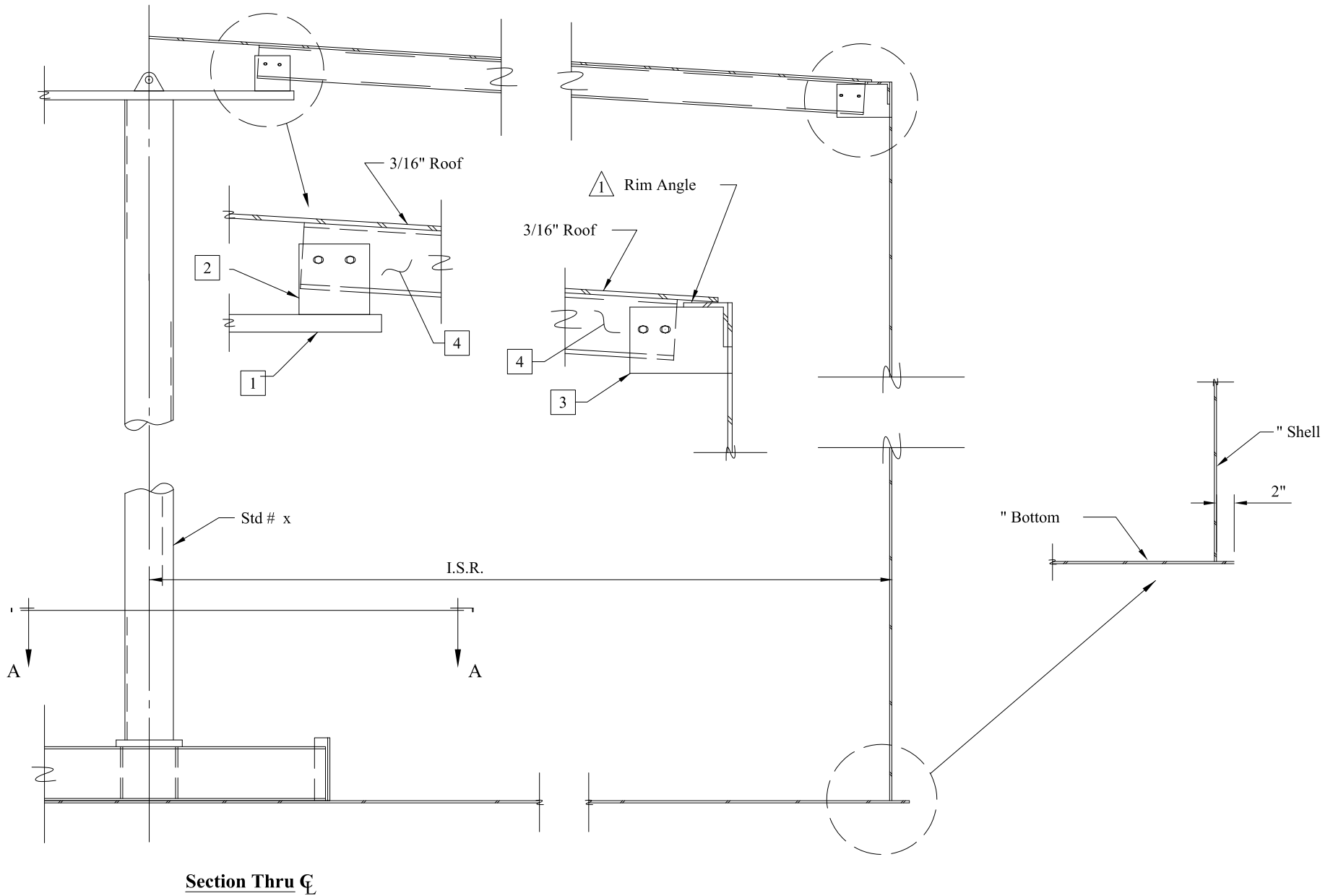
@ 3/8" x "x"
with 2 - 11/16" x 1 1/16" slots



3 **Rafter Clips**

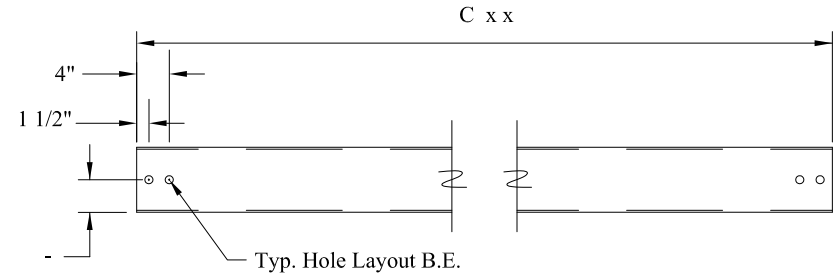
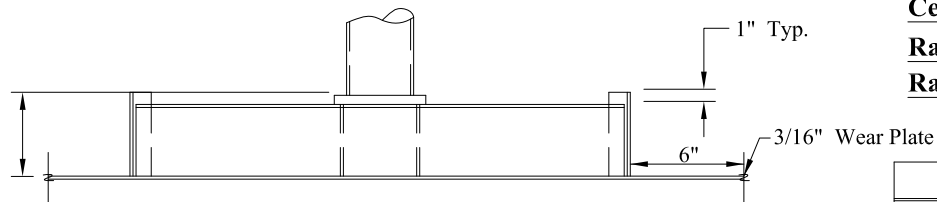
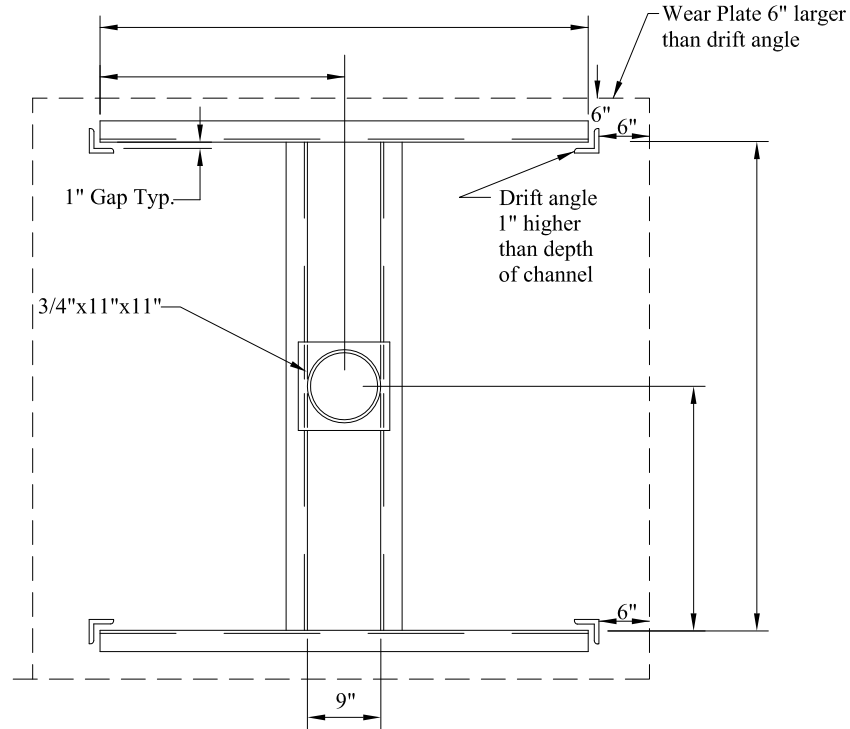
@ 3/8" x 6" x 8"
with 2 - 11/16" x 1 1/16" slots





Section A-A

4 @ C x # x



4

Rafters

@ C x # x
with 2 - 11/16" X 1 1/16" slots each end
@ 5/8" X 1 1/2" A307B zinc plated bolts
@ 5/8" A307B zinc plated nuts

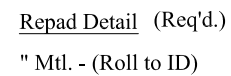
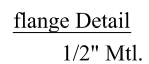
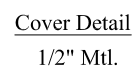
Center Pole Weight:

Rafter Weight:

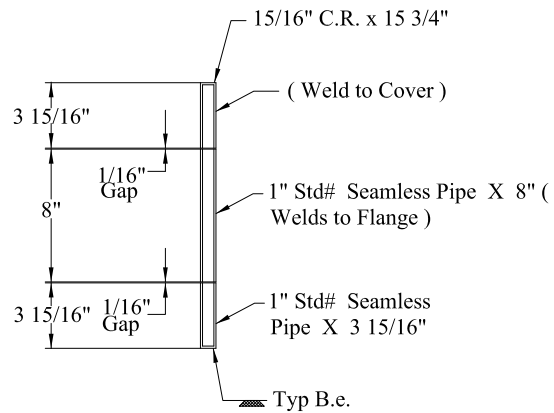
Rafter Clips Weight:

1 Rim Angle		
Size	Roll Radius	Stretchout
-	O.S.R.	-
Total Weight:		

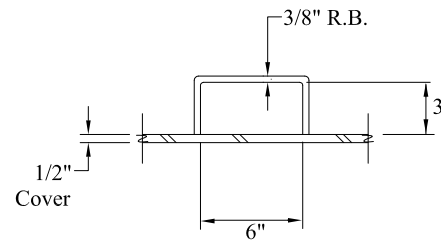




General Notes
Shop to weld manway to
repad with core wire NR- 211



Hinge Detail



Handle Detail

AWWA NAME TAG

Edition -

Section -

Nominal Diameter -

Nominal Capacity -

Specific Gravity -

Manufacturers W.O.# -

Year Complete - 200

Nominal Height -

Purchasers Tank No. -

Corrosion Allowance - N/A

Shell Course

Material

Thickness

1

A36

-

2

A36

-

3

A36

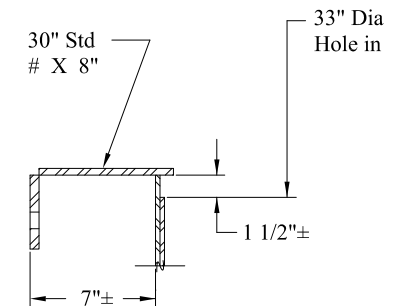
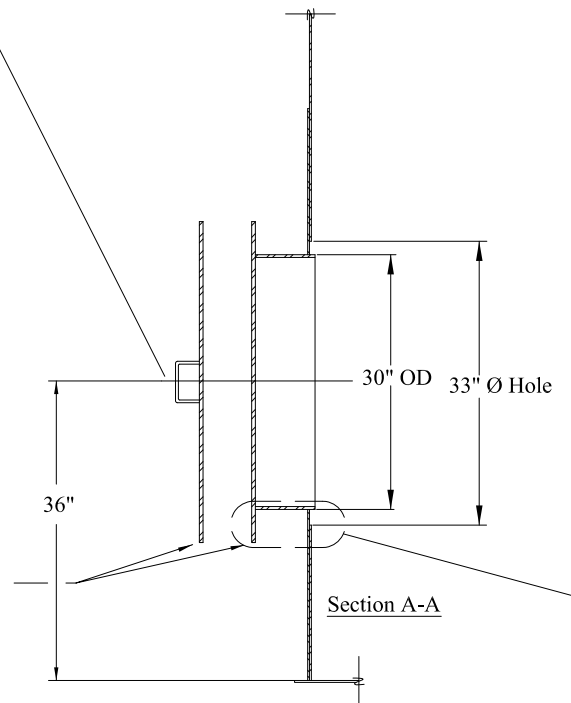
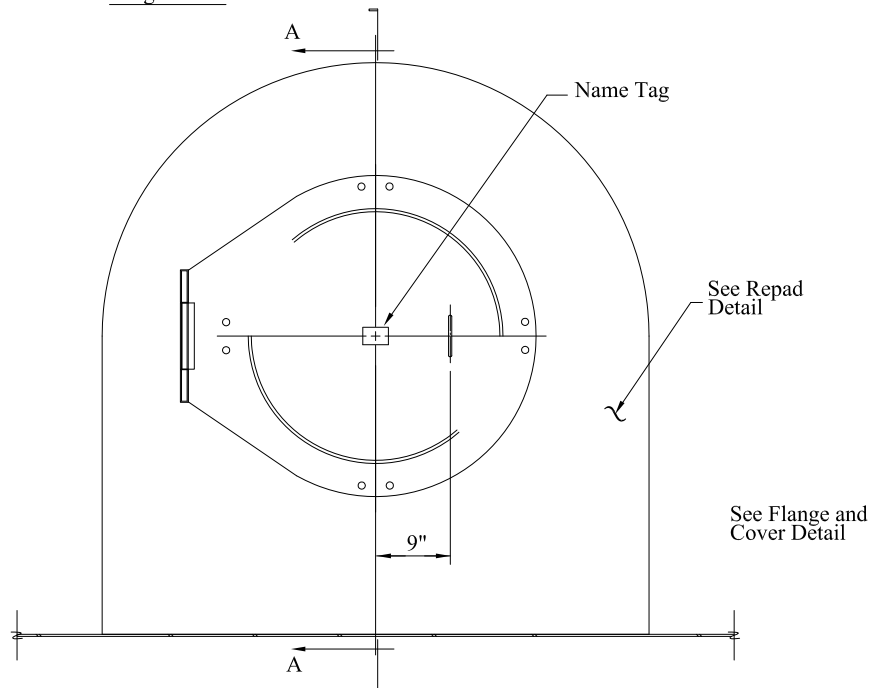
-

4

A36

-

Hinge Detail



30" Shell Manway (Req'd)

- 3/4" X 2" A307B zinc plated bolts
- 3/4" A307B zinc plated nuts
- 1/8" X 30" ID X 38 3/4" neoprene gasket w/ 42 @ 7/8" Ø holes on 36 1/4" B.C.

30" SHELL MANWAY - 2

Revised:
12-31-12

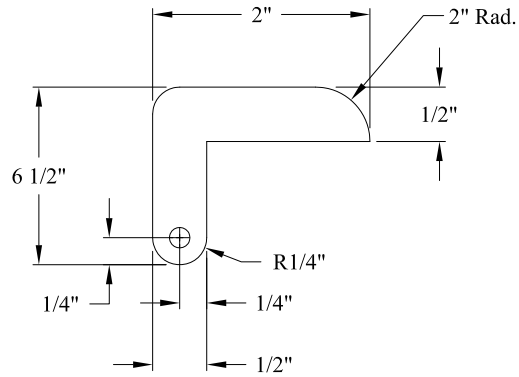
Detail No.
33220-2



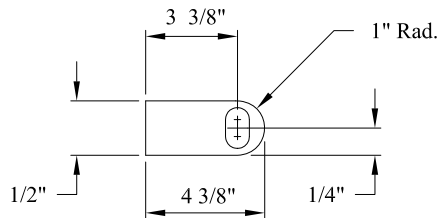


30" ROOF MANHOLE

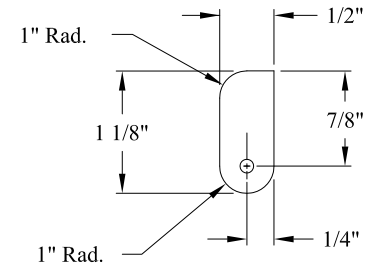
- 1 1 @ 3/16" X 13/16" I.d. X 30 1/8" O.D. W/ 1 13/16" Straight Flange
- 2 1 @ 1/4" X 8" X 76 3/16" - Roll To 24" I.D.
- 3 2 @ 1/4" X 6 1/2" X 8" W/ 13/16" Ø Holes



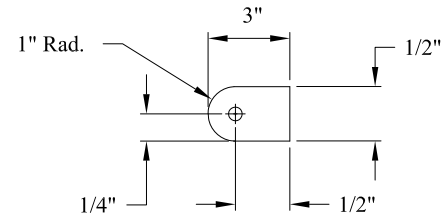
- 4 2 @ 1/4" X 2" X 4 3/8" W/ 1 1/2" X 7/8" Slot



- 5 1 @ 1/4" X 2" X 4 1/2" W/ 13/16" Ø Hole

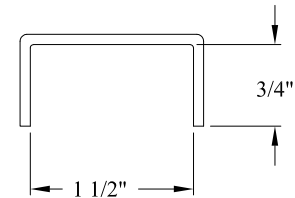


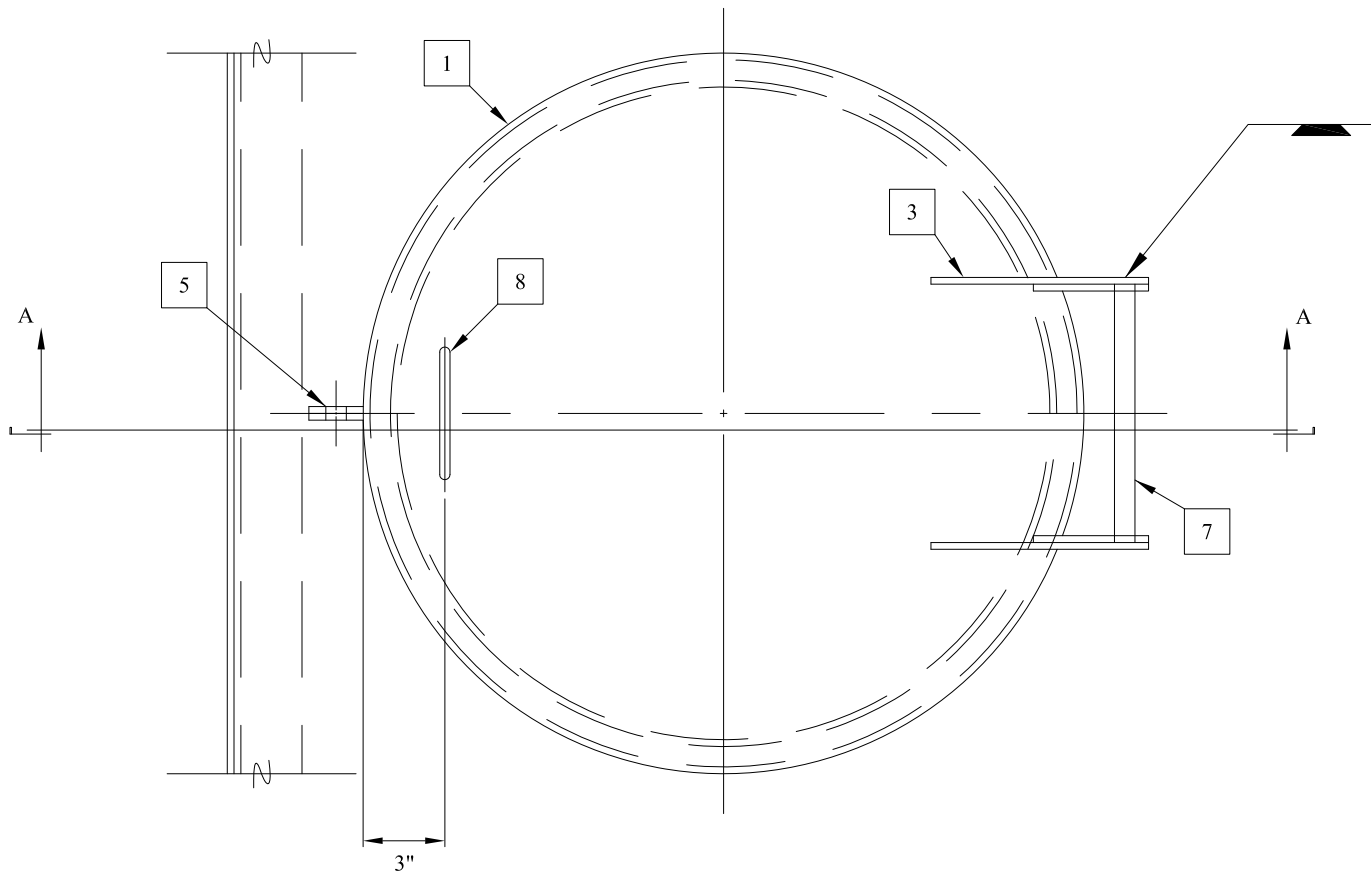
- 6 1 @ 1/4" X 2" X 3" W/ 13/16" Ø Hole

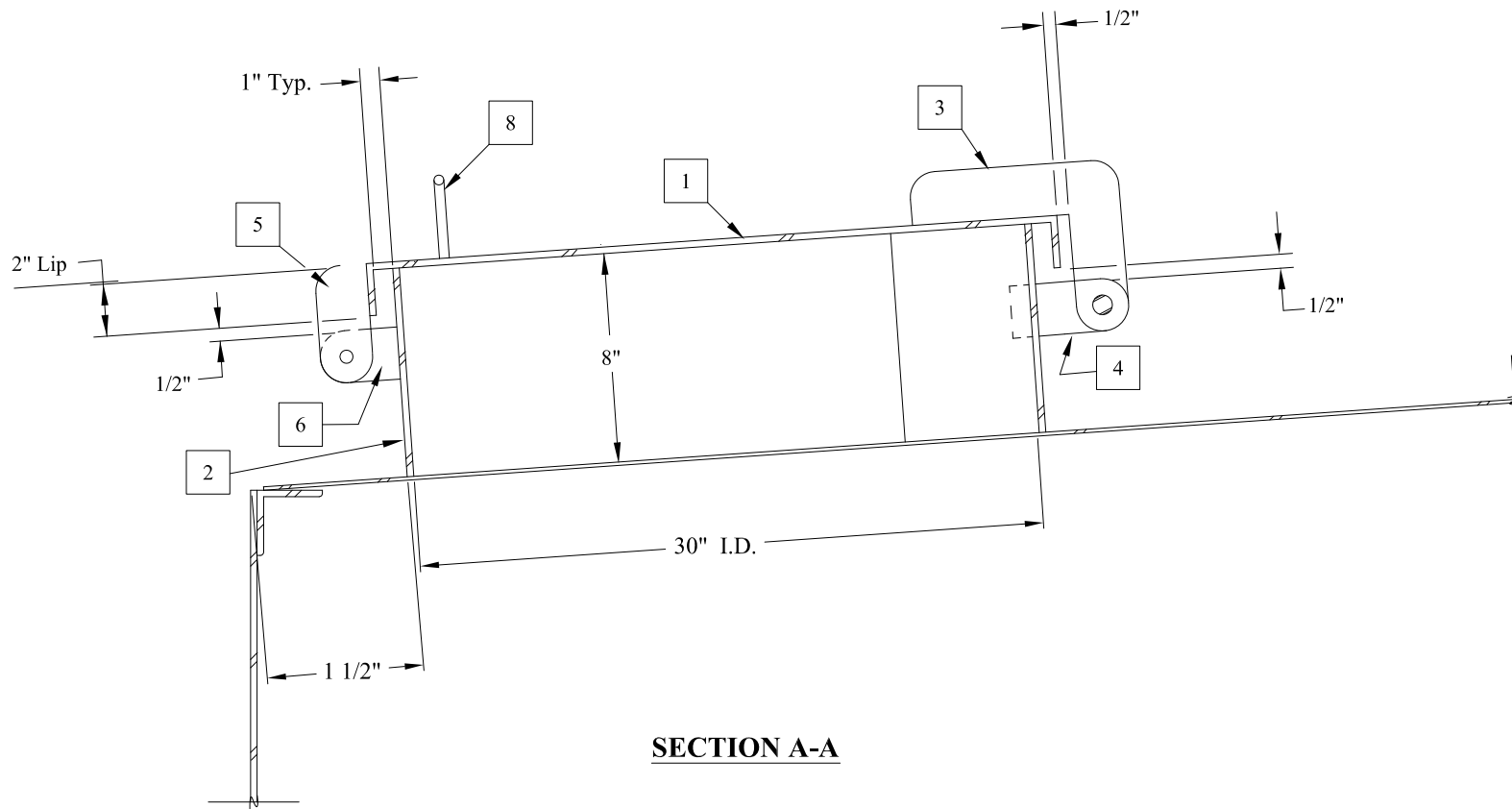


- 7 1 @ 3/4" R.b. X 9 3/4"

- 8 1 @ 3/8" R.b. Handle







OUTSIDE LADDER w/ BARREL



- 1 Side Stringers
2 @ 3/8" X 2" X
- 2 Rungs
@ 3/4" Rb X 15 7/8"
- 3 Barrel
2 @ 10 Ga X 47.5" X 95.318"

(Roll To 36" O.d.)

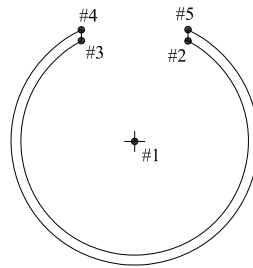
- 4 Small Hoops
@ 1/4" X 2" X 76" (Roll To 30" o.d.)

- 5 Hoop Stringers
7 @ 1/4" X 2" X

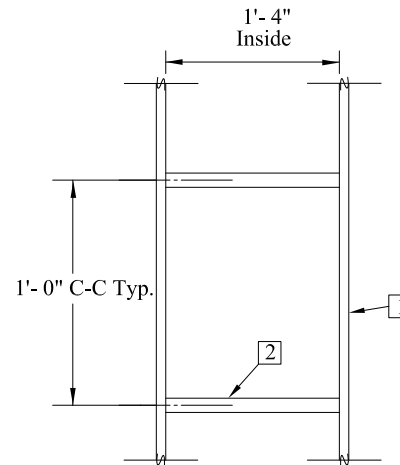
- 6 Standoffs
@ 3/8" X 2" X 9"

- 7 Barrel Extensions
2 @ 1/4" X 9" X 92"

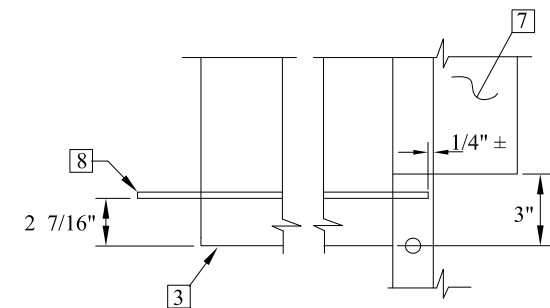
- 8 Barrel Stiffener
1 @ 5/16" X Sketch



	X	Y	R
1)	0	0	
2)	8.4375	15.933	
3)	-8.4375	15.933	18
4)	-8.4375	17.683	
5)	8.4375	17.683	19.566
2)	8.4375	15.933	



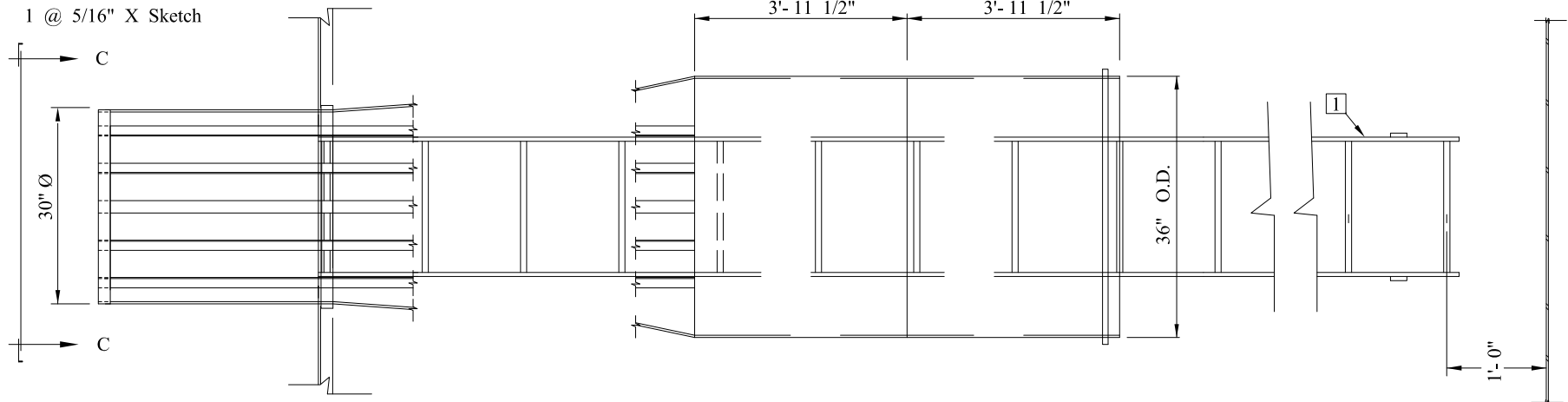
Section A-A



Detail # 1

GENERAL NOTES

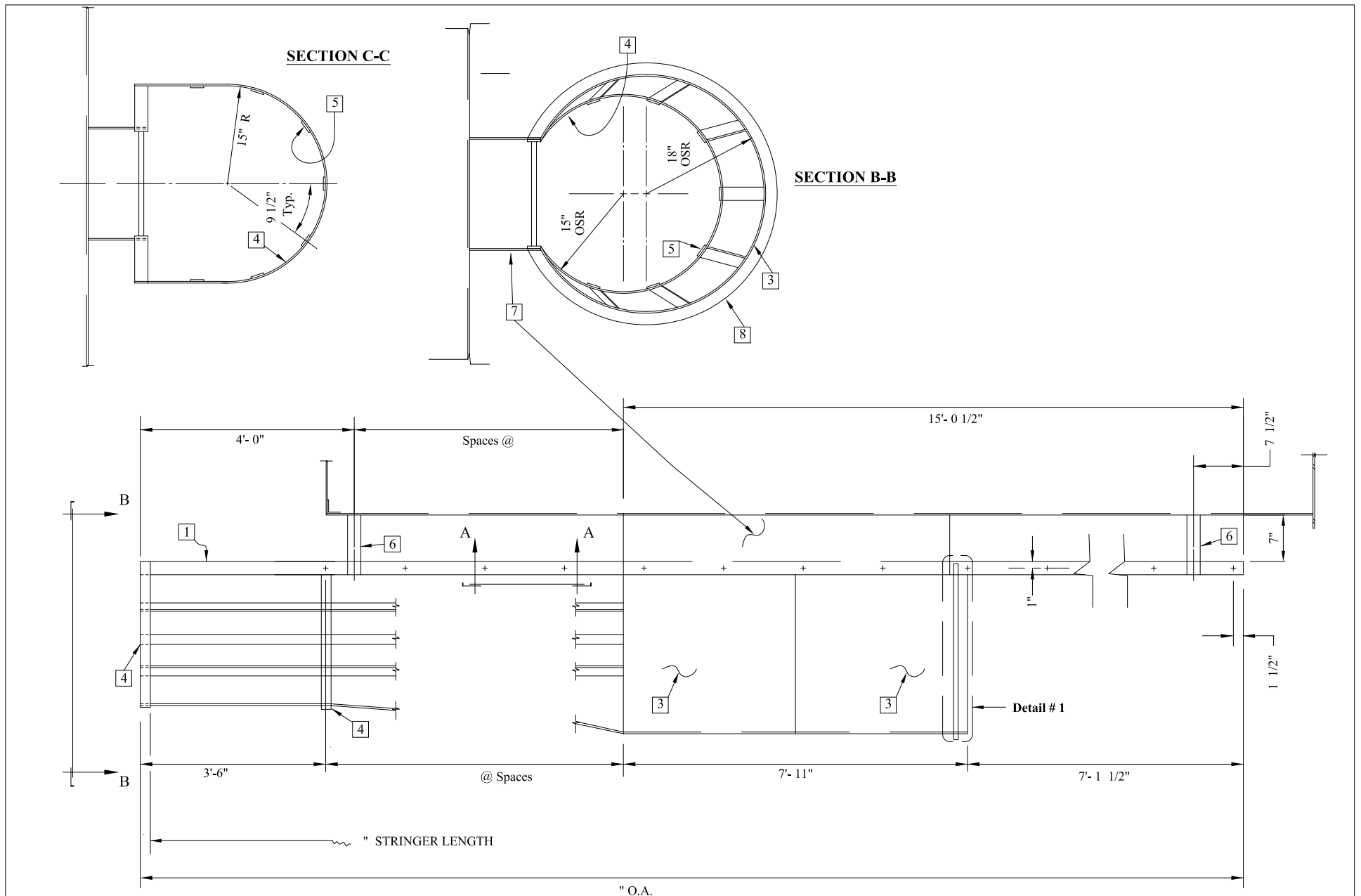
- The ladder detailed on the final drawings shall comply with OSHA regulations.
- Ladder rungs are weldable rebar.

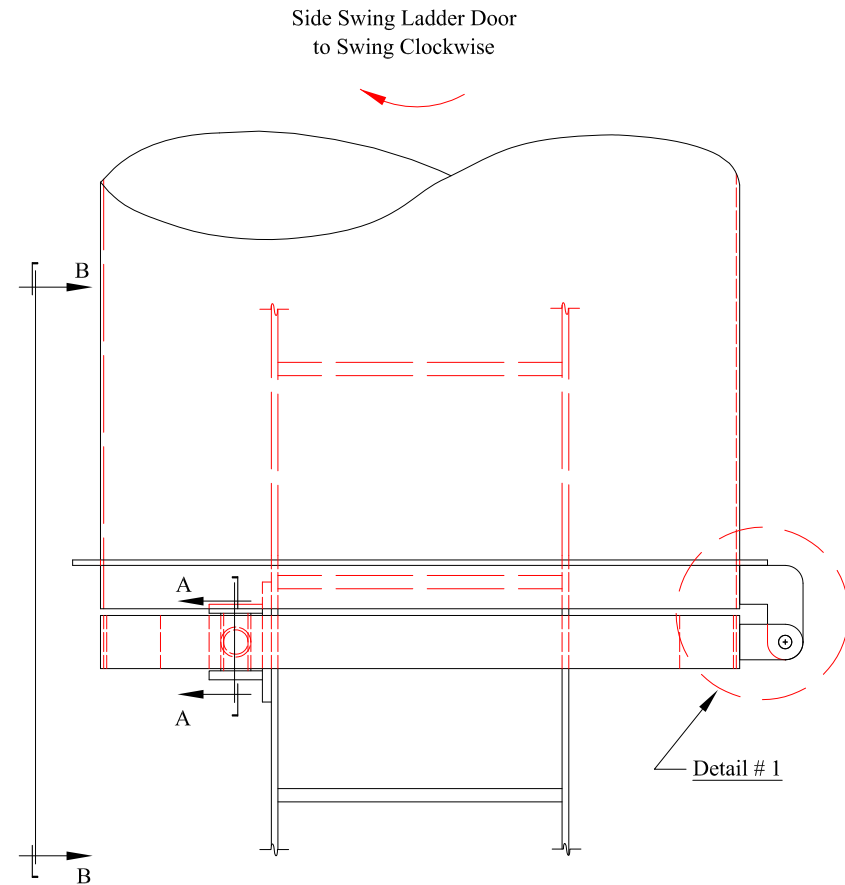
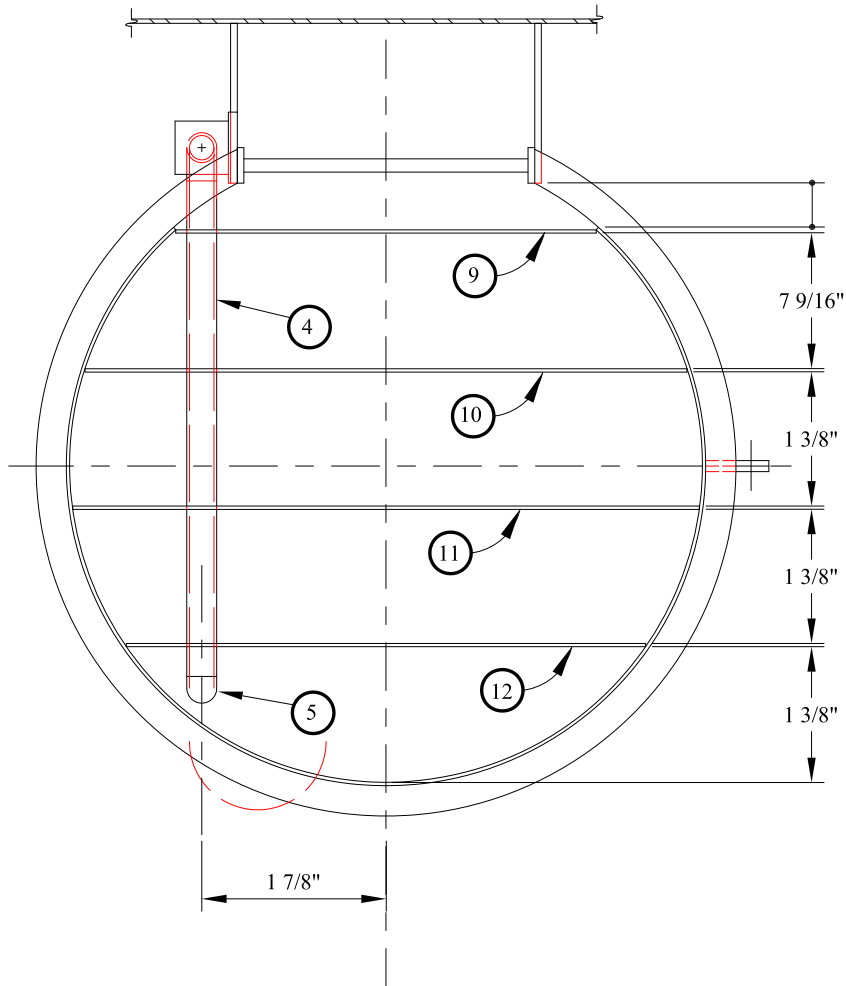


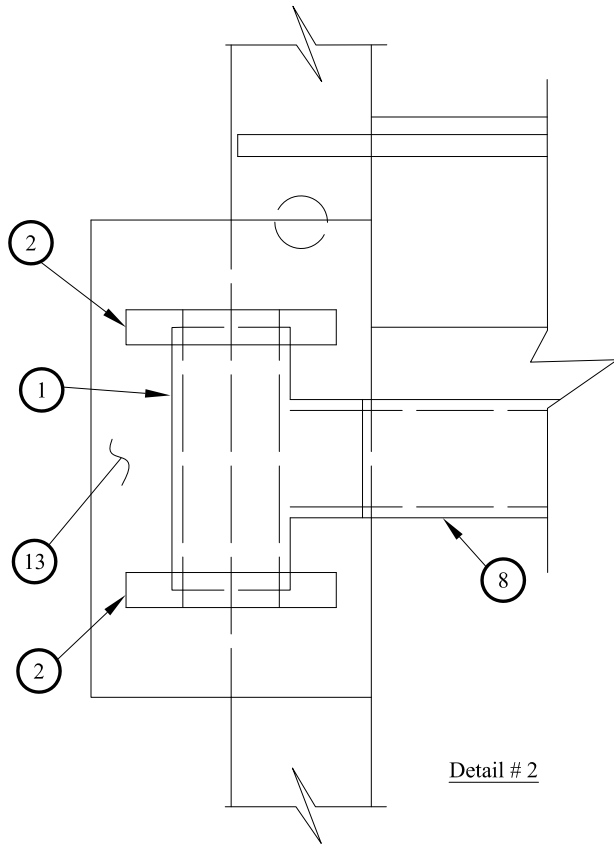
OUTSIDE LADDER - 1

Revised: 12-31-12
Detail No. 33230-1

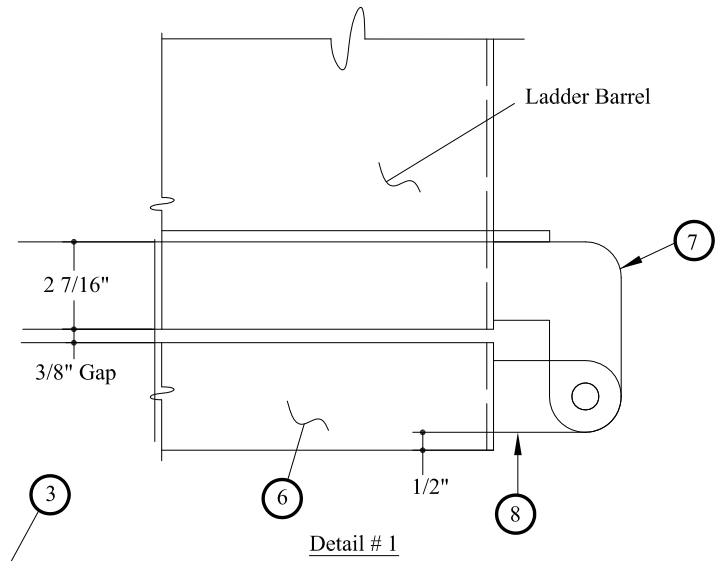




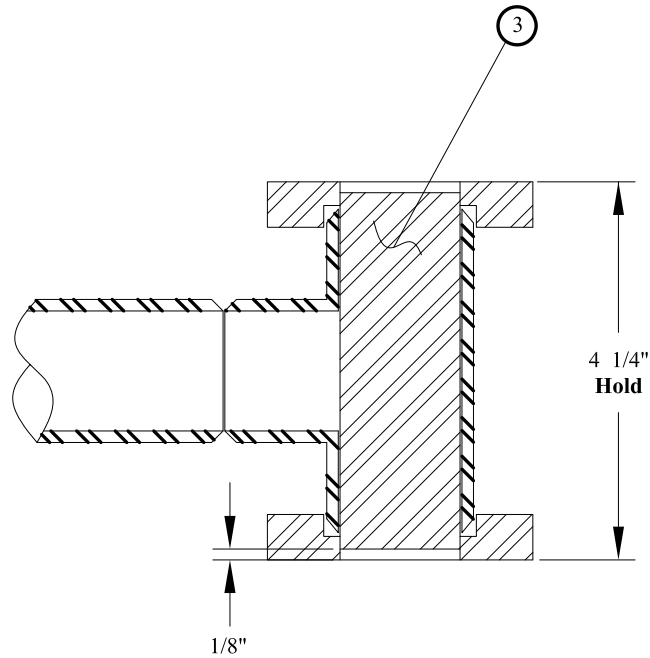




Detail # 2



Detail # 1



Section A-A

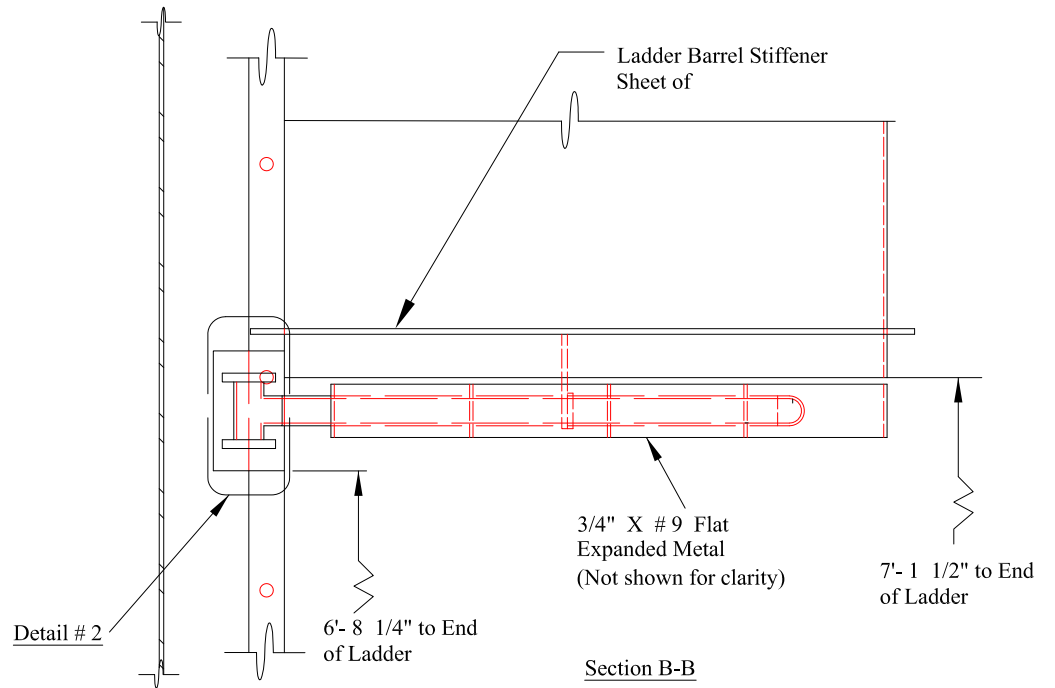
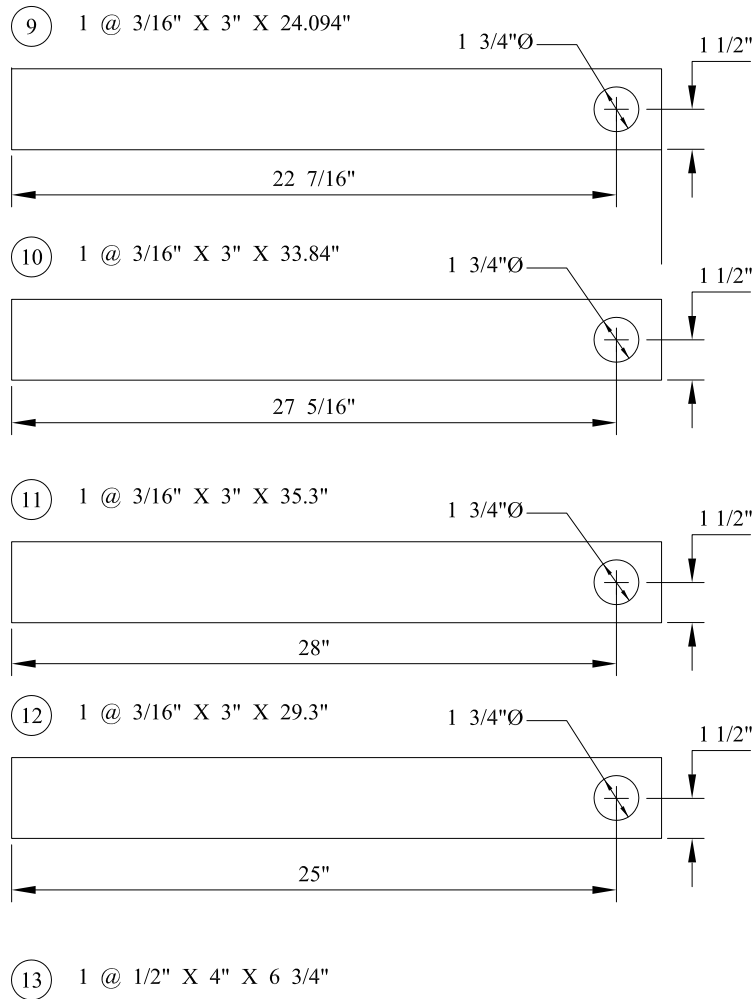
LADDER DOOR, CLOCKWISE - 2

Town of Buckeye
Standard Details

Revised:
12-31-12

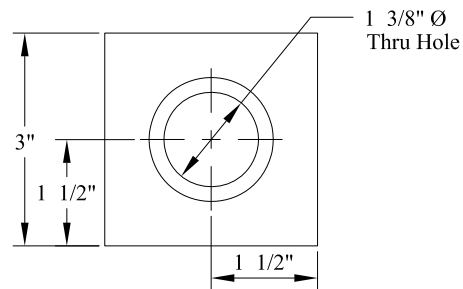
Detail No.
33232-2



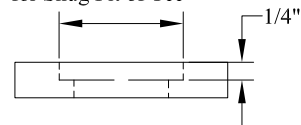


① 1 @ 1 1/4" Std# Straight Tee

② 2 @ 1/2" x 3" x 3"



Counter Bore Hole
for Snug Fit of Tee



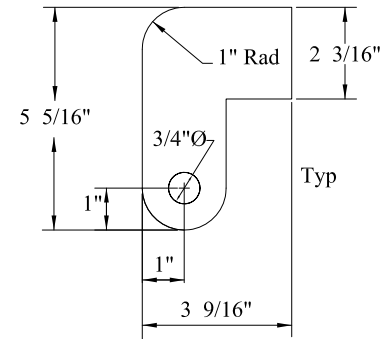
③ 1 @ 1 3/8" C.R. x 4"

④ 1 @ 1 1/4" Std# X 2'-3 7/8"

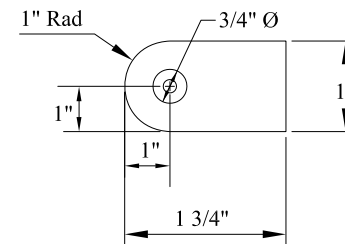
⑤ 1 @ 1 1/4" Std# Weld Cap

⑥ 1 @ 3/16" X 3" X 85.907" (Roll To 2'-11 5/8" I.D.)

⑦ 1 @ 5/16" x 3 9/16" x 5 5/16"



⑧ 1 @ 5/16" x 2" x 3 9/16"

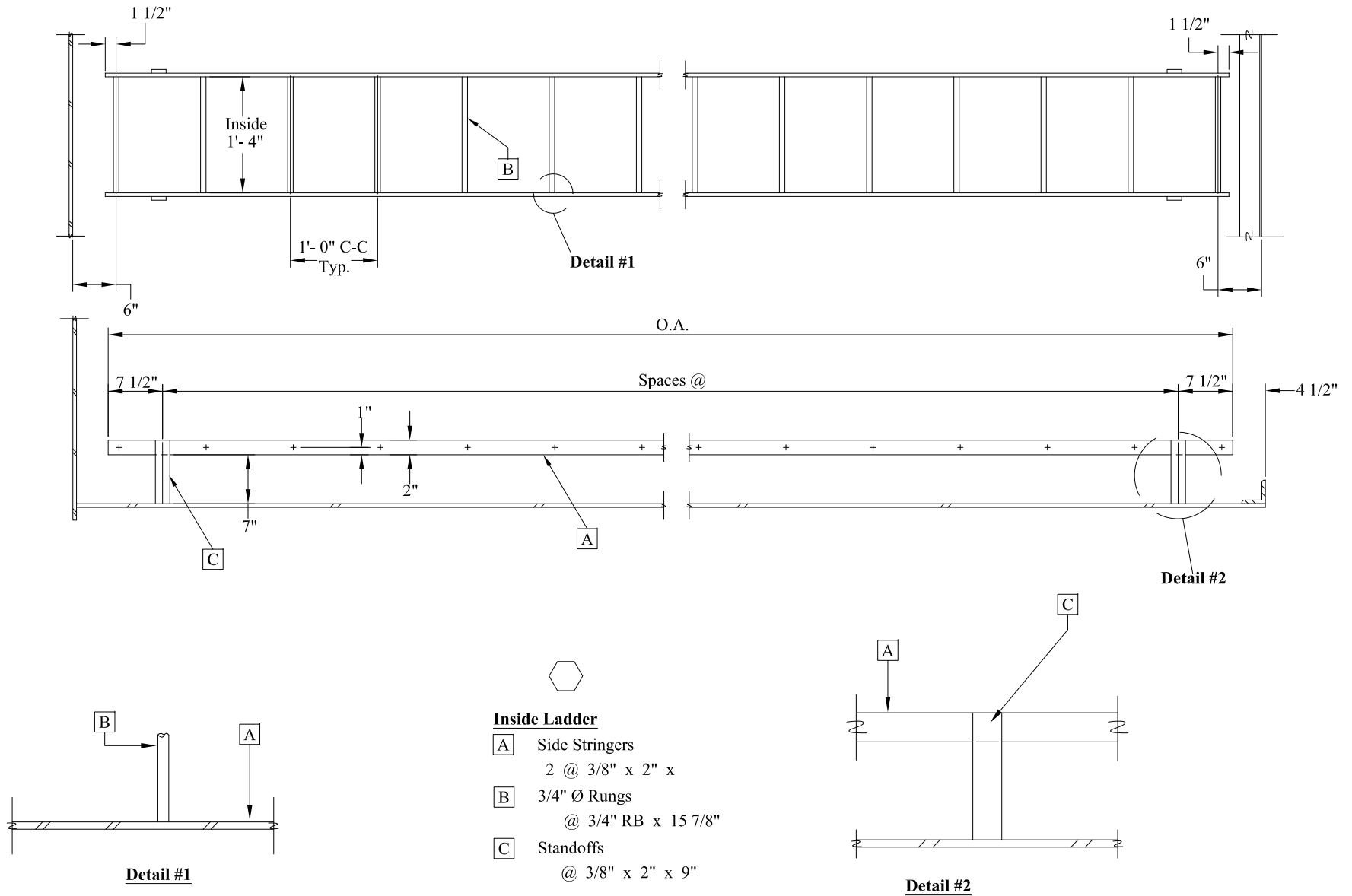


LADDER DOOR, CLOCKWISE - 4

Revised:
12-31-12

Detail No.
33232-4





TOTAL WEIGHT:

33236

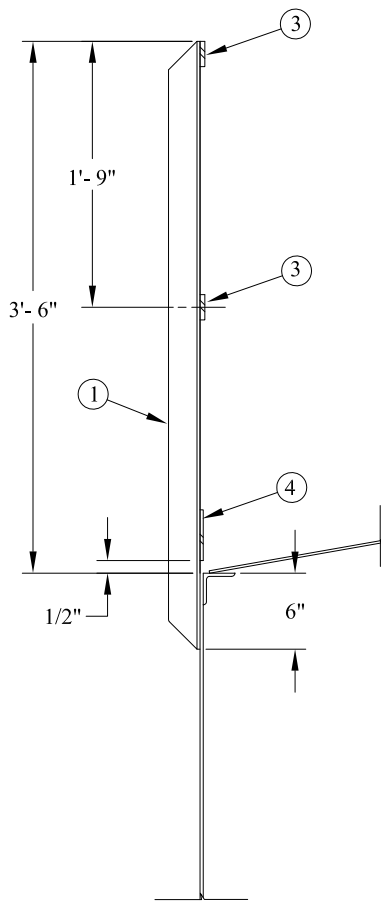


Town of Buckeye
Standard Details

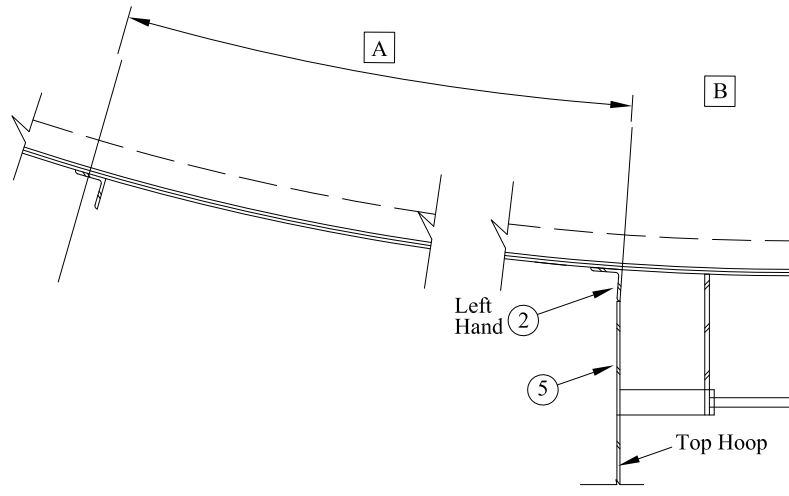
INSIDE LADDER

Revised:
12-31-12

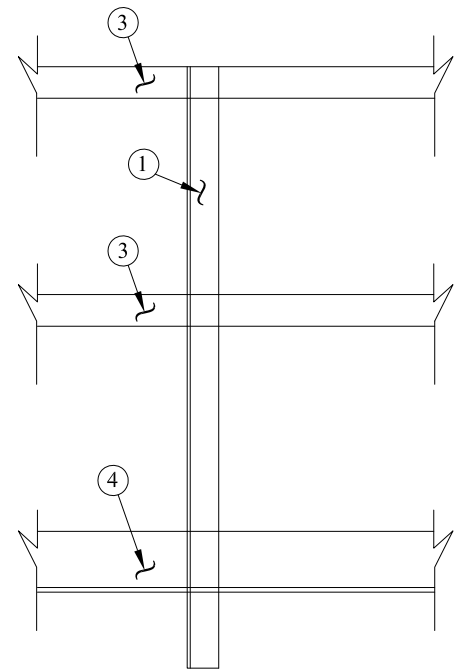
Detail No.
33236



Section A-A

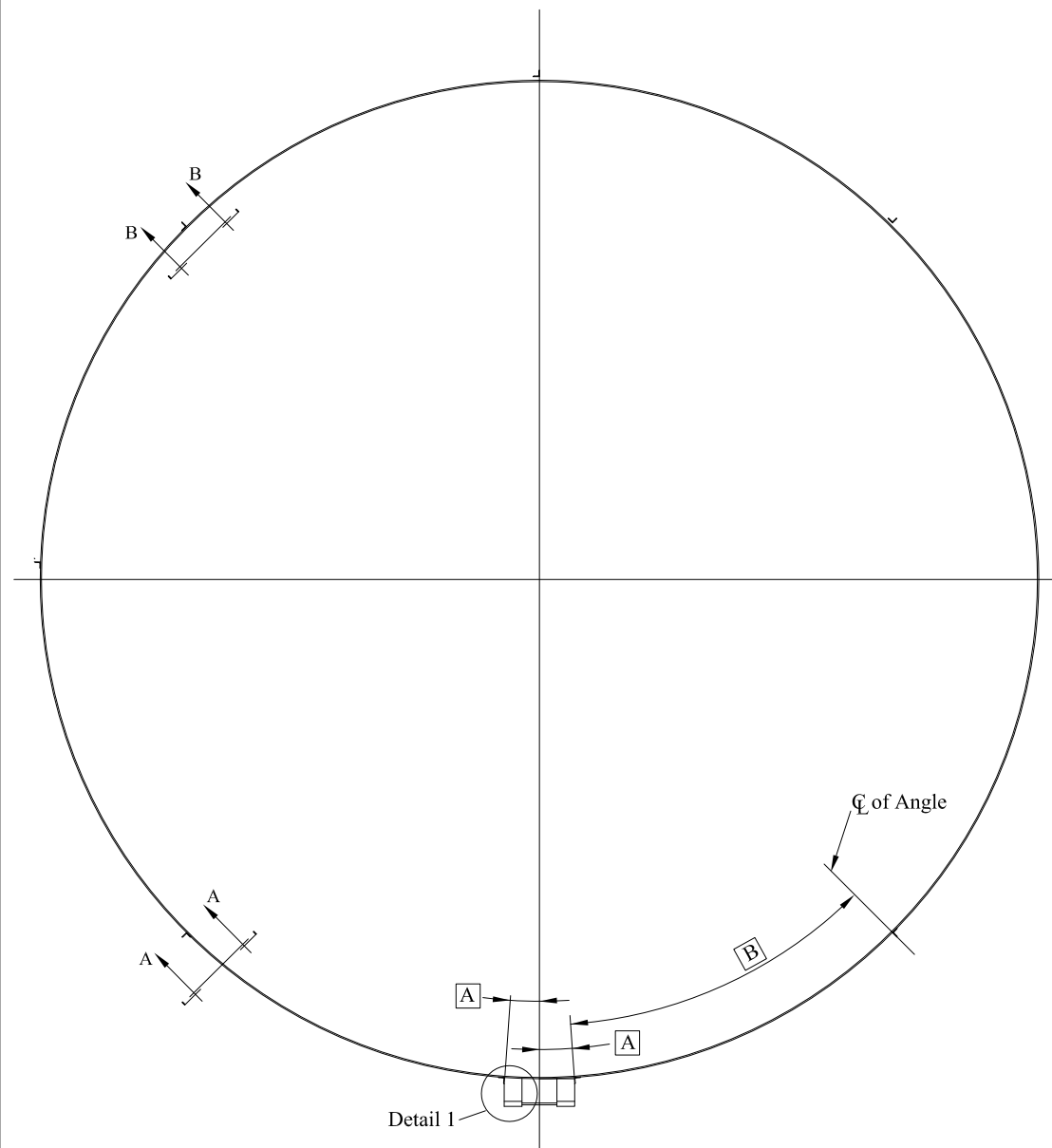


Detail 1



Section B-B





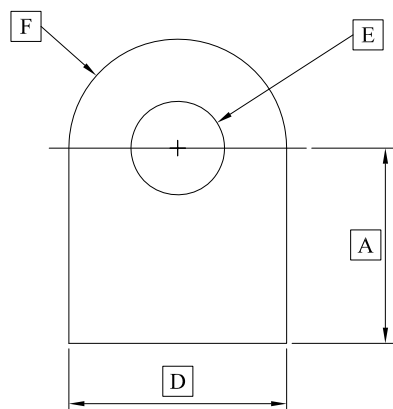
- ① @ 2 1/2" x 2 1/2" x 1/4" x 4'- 0"
- 45° Typ. B.E.
- 4'- 0"
- 1 @ 2 1/2" x 2 1/2" x 1/4" x 4'- 0" (miter one end only) right hand
- 45°
- 4'- 0"
- ② 1 @ 2 1/2" x 2 1/2" x 1/4" x 4'- 0" (miter one end only) left hand
- 45°
- 4'- 0"
- ③ @ 3/8" x 2" x (Roll to I.D.)
- ④ @ 1/4" x 4" x (Roll to I.D.)
- ⑤ 2 @ 1/4" x 2" x 12" (trim to length in field.)
Ladder extensions (2 req'd)

Angle hand rail around tank
Dimensions are around
outside of tank shell

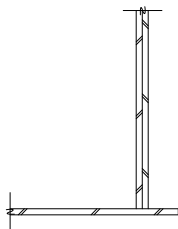
A -

B -

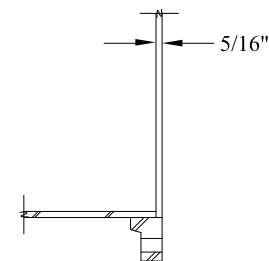




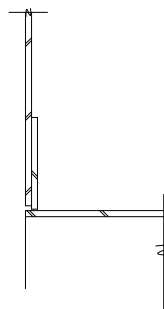
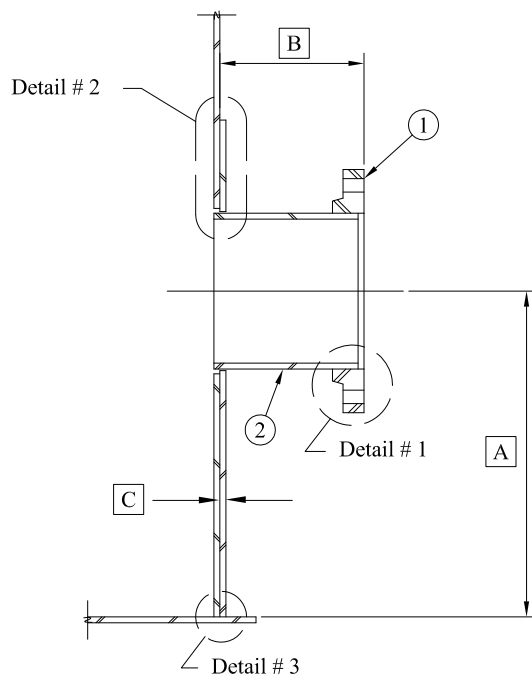
Repad Detail
Roll to Ø



Detail #3
Bevel back side of repad for
bottom to shell weld relief



Detail #1



Detail #2

GENERAL NOTES 1) Bolt holes to straddle ϕ

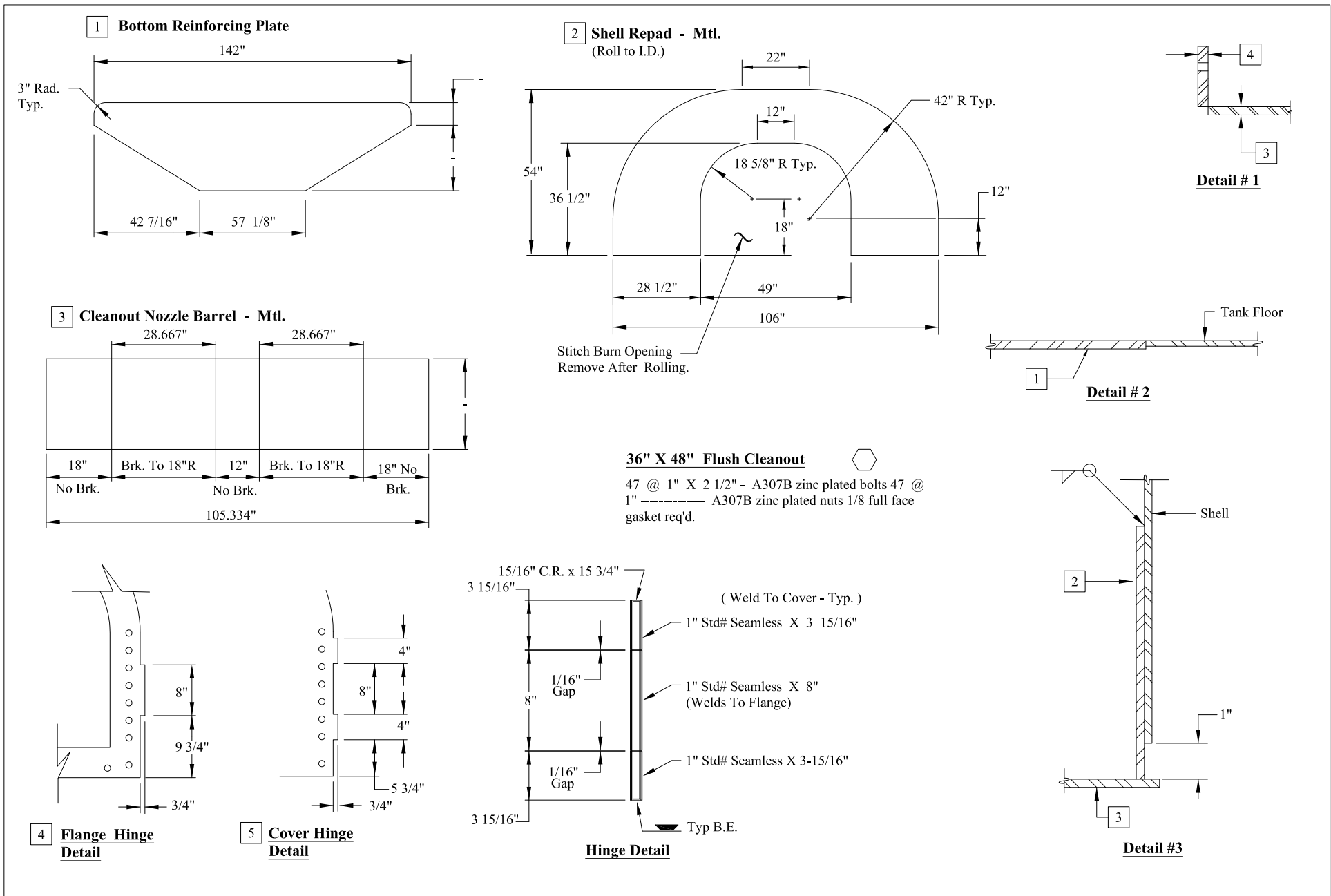


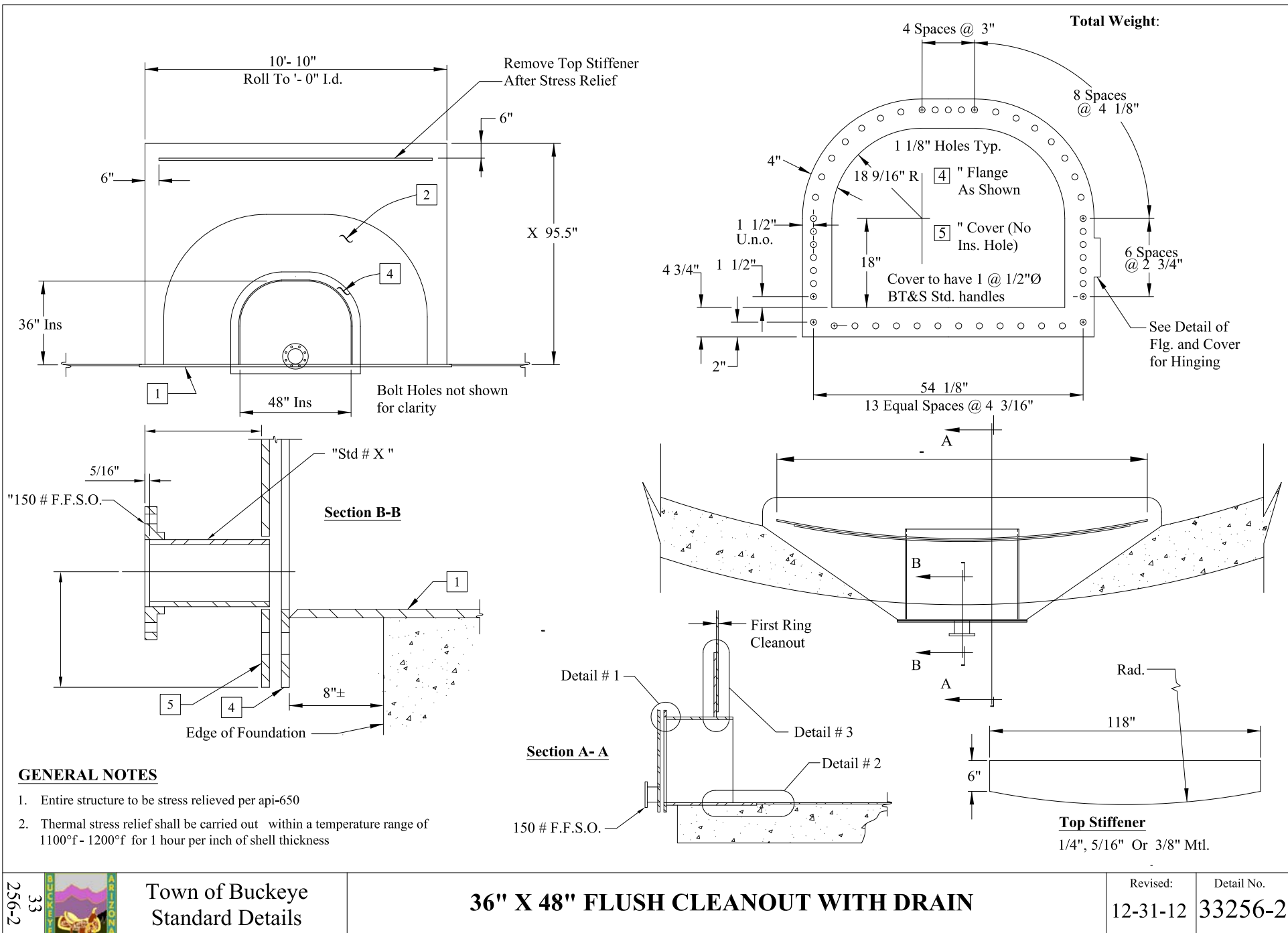
A	-
B	-
C	-
D	-
E	-
F	- " Radius

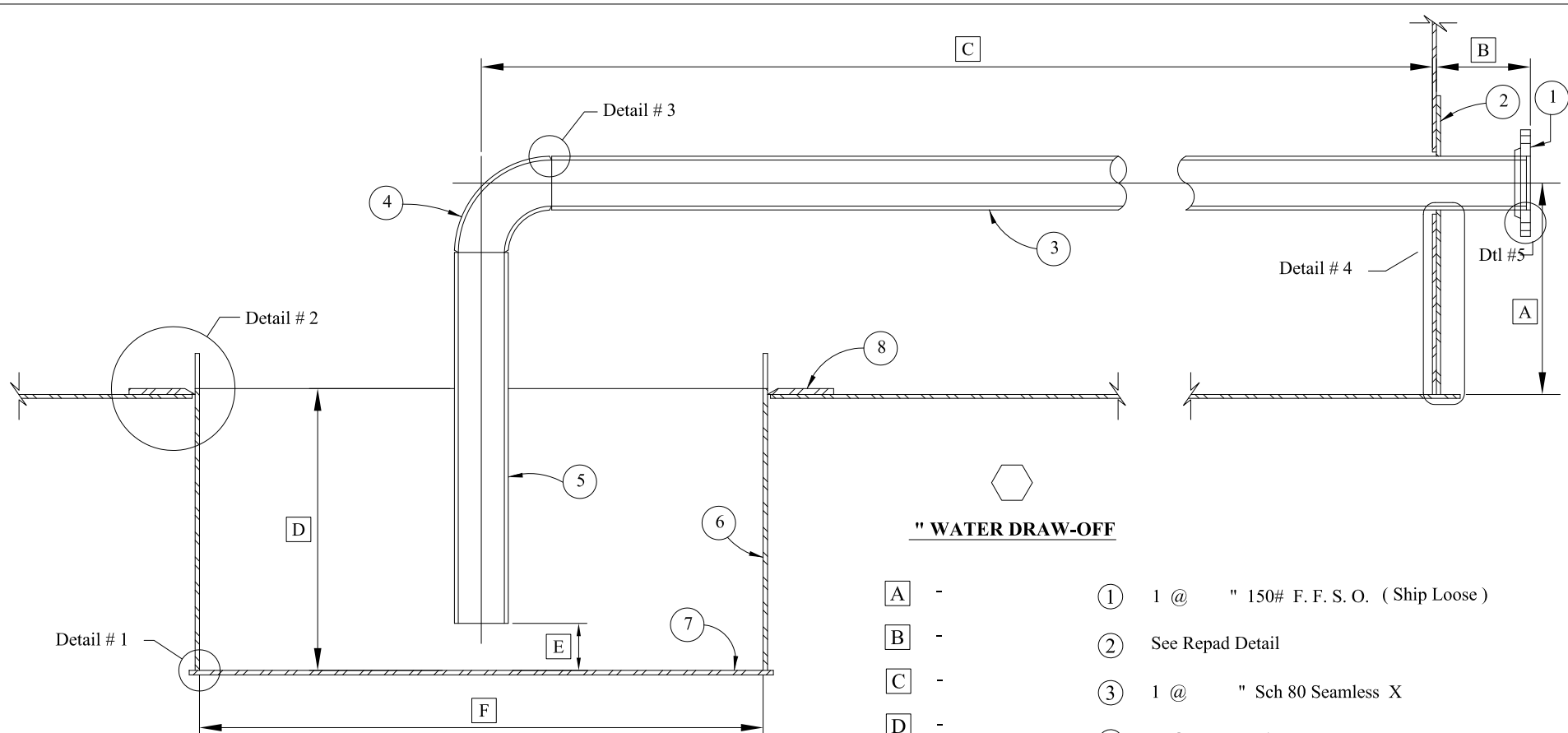
- ① - " 150# F.F.S.O.
- ② - " Std. #x

TOTAL WEIGHT:









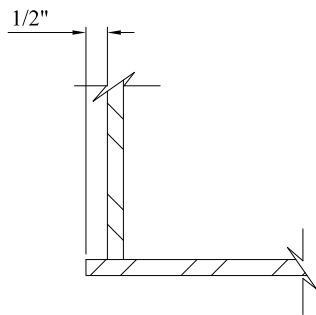
" WATER DRAW-OFF

A	-	①	1 @	" 150# F. F. S. O. (Ship Loose)
B	-	②	See Repad Detail	
C	-	③	1 @	" Sch 80 Seamless X
D	-	④	1 @	" Std # LR 90°
E	-	⑤	1 @	" Std # X
F	-	⑥	1 @ 3/8" X	X (Roll to " ID)
		⑦	1 @ 3/8" X	OD
		⑧	1 @ 1/2" X	" ID X " OD

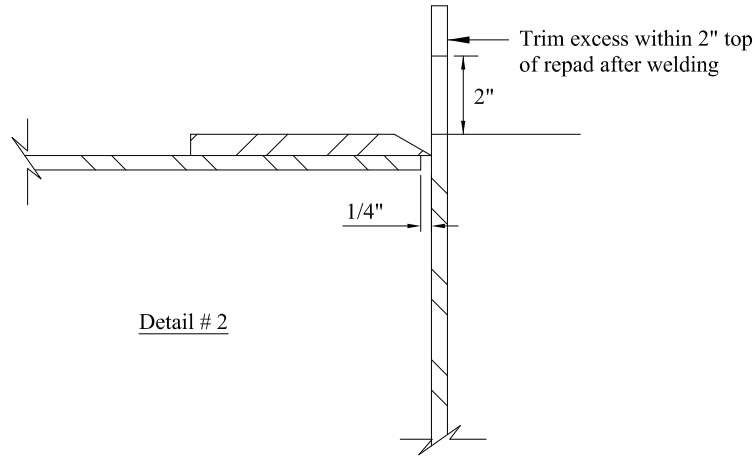
General Notes

1) Bolts holes to staddle ⌀'s

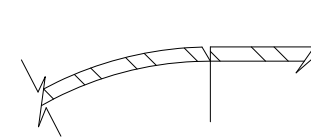




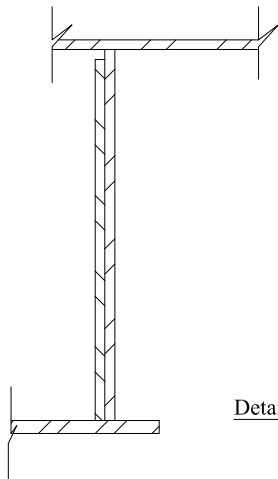
Detail # 1



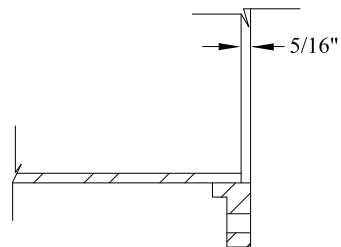
Detail # 2



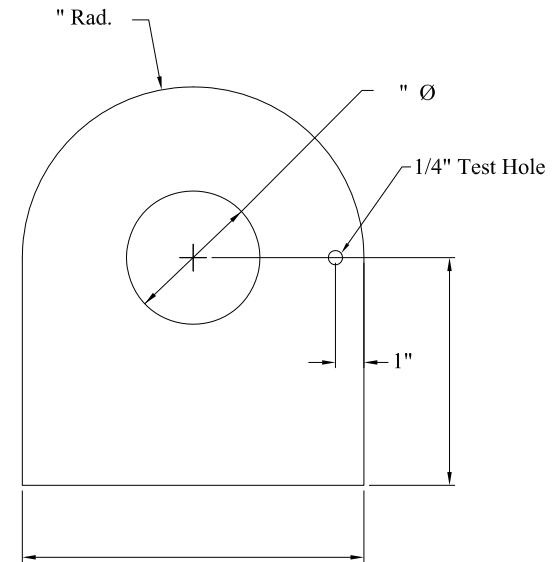
detail # 3



Detail # 4



Detail # 5



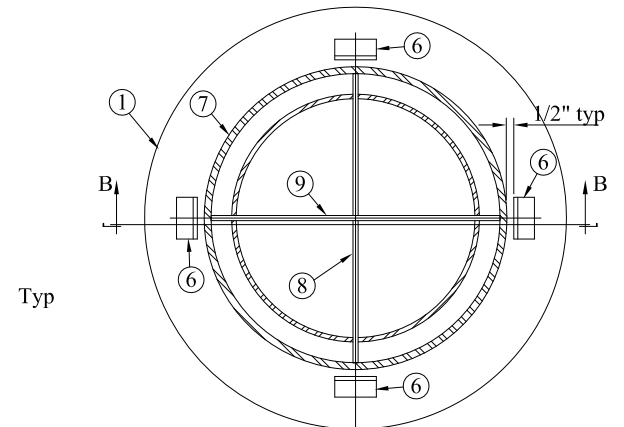
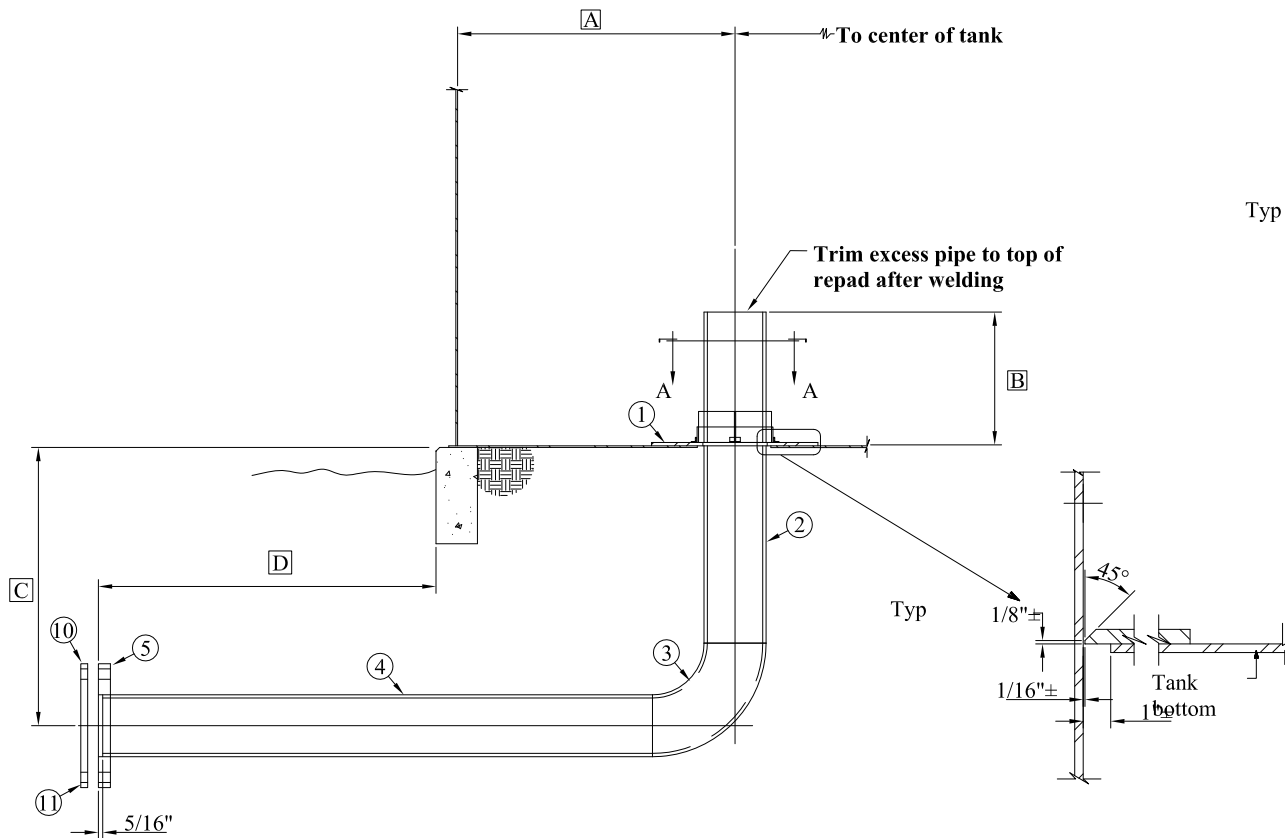
Repad Detail
" Mtl. - Roll to I.D.

WATER DRAW (SUMP)

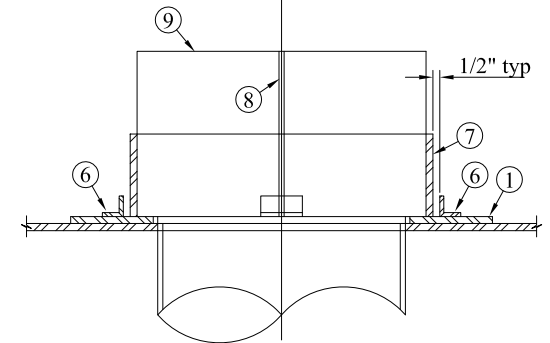
Revised:
12-31-12

Detail No.
33260-2





Section A-A



Section B-B

Suction w/ Anti-Vortex

A -	① 1 @ 1/2" x x	⑥ 4 @ 2 1/2" x 2 1/2" x 1/4" x 3" lg.
B 1'-0"	② 1 @ Std# x	⑦ 1 @ 3/8" x 6" x (roll to I.D.)
C -	③ 1 @ Std# LR90°	⑧ 2 @ 3/8" x 12" x
D -	④ 1 @ Std# x	⑨ 1 @ 3/8" x 12" x
	⑤ 1 @ 150# FFSO	⑩ 1 @ 1/4" x O.D. w/ 4 @ Ø holes on a B.C.
		⑪ 4 @ x A307B black bolts 4 @ A307B black nuts

Notes:

1. The interior of the suction is to be surface prepared and coated with the same material as the tank interior.
2. Exterior coated with 16 Mills coal tar epoxy.

Total weight:

WATER DRAIN - UNDERTANK

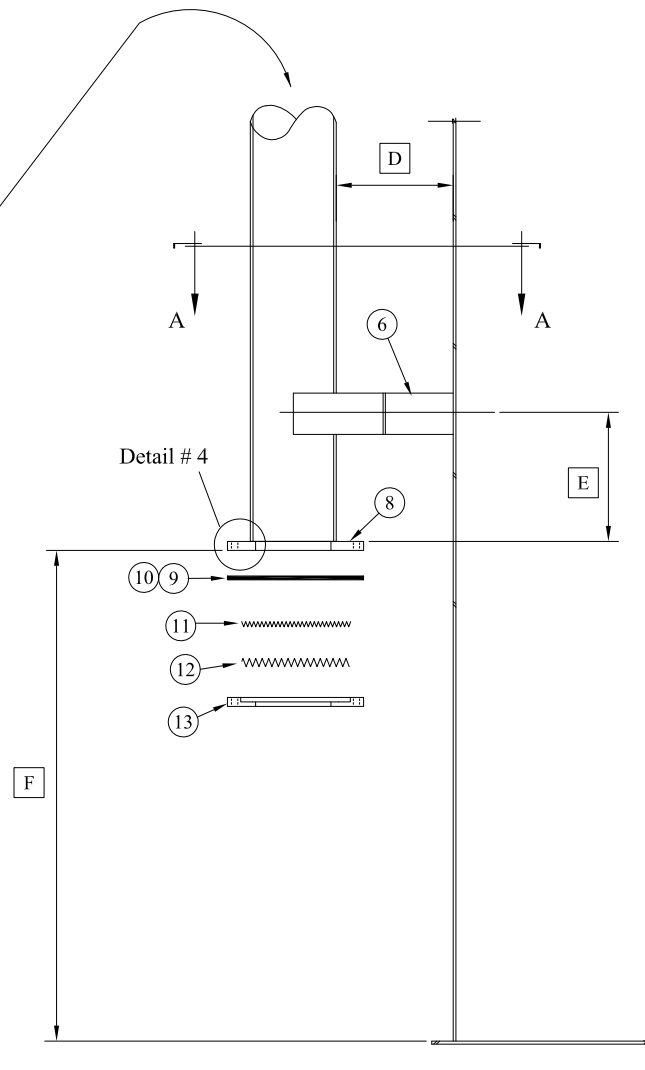
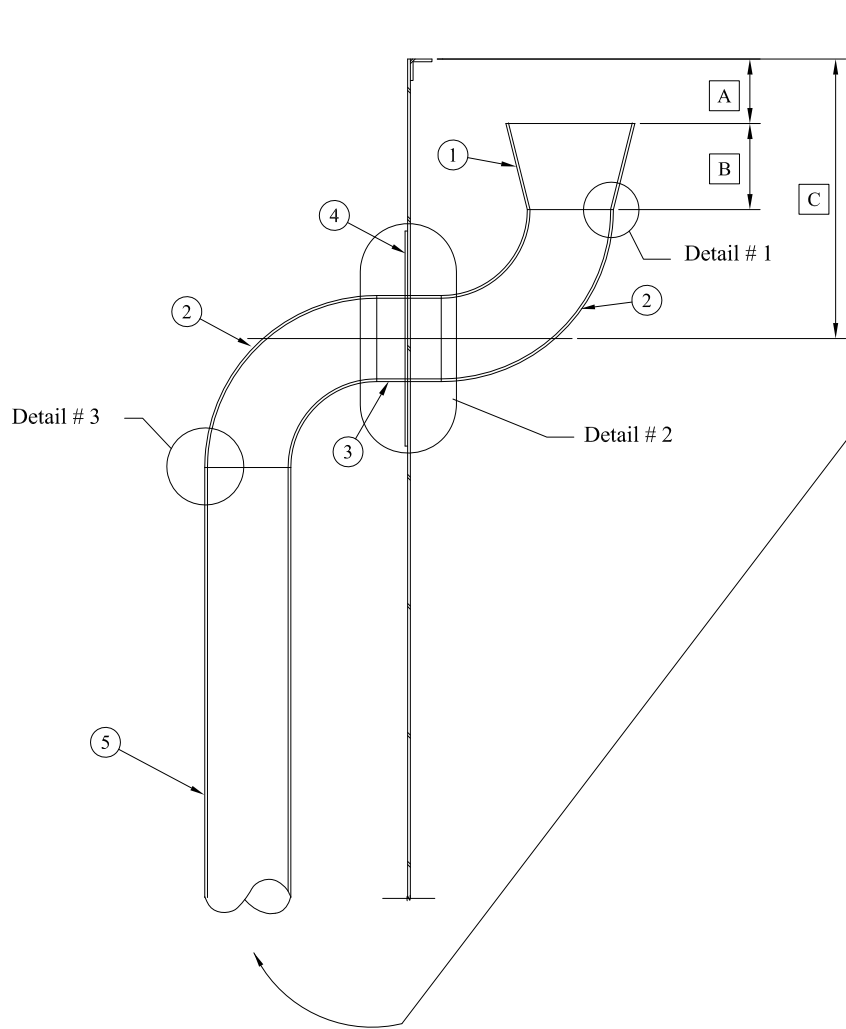
Revised:
12-31-12

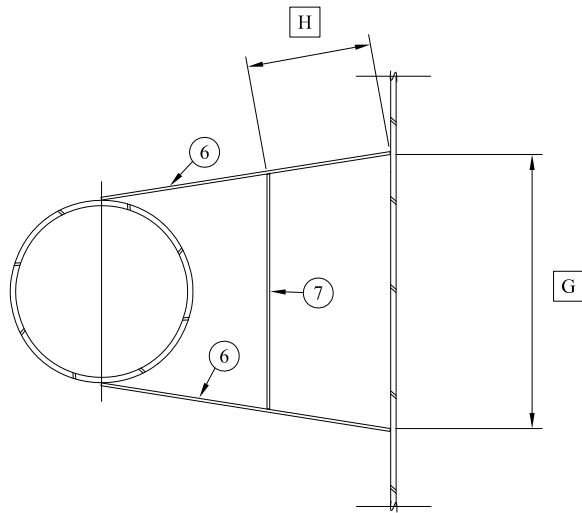
Detail No.
33262

Town of Buckeye
Standard Details

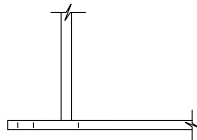
33262



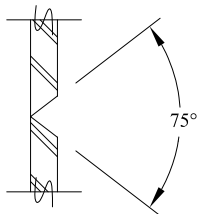




SECTION A-A

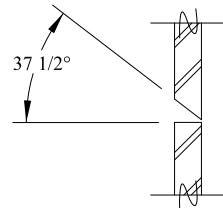


DETAIL # 4



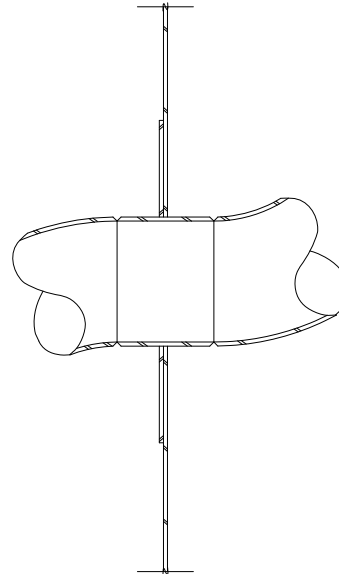
TYPICAL WELD FITTING TO
WELD FITTING

DETAIL # 1

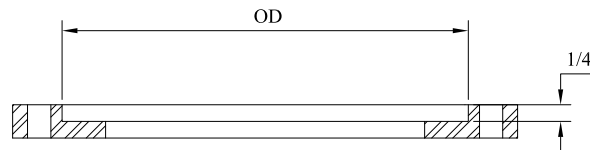


TYPICAL PIPE TO WELD FITTING
(U.N.)

DETAIL # 3



DETAIL # 2

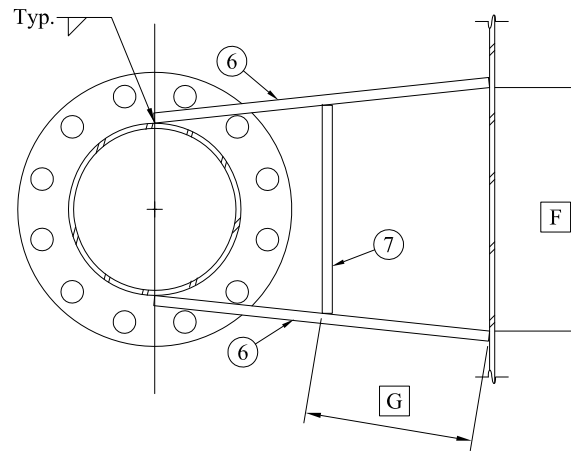
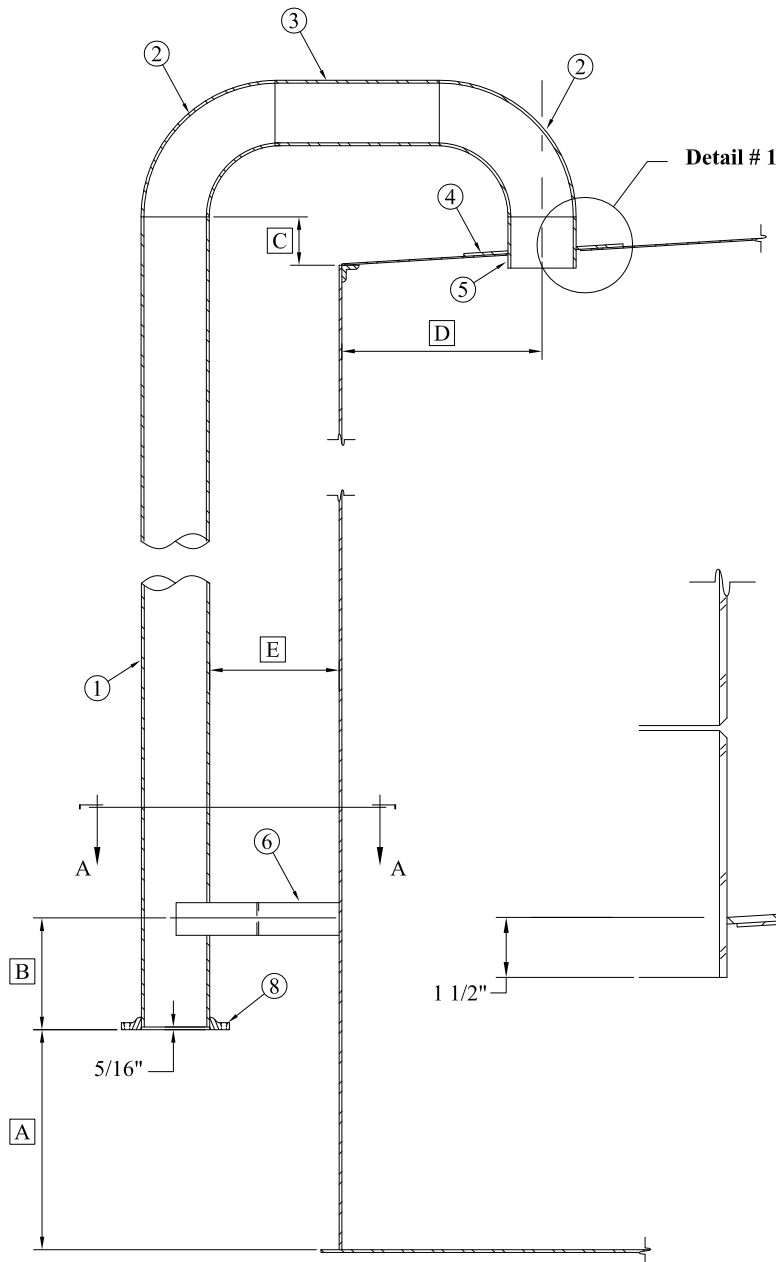


" OVERFLOW

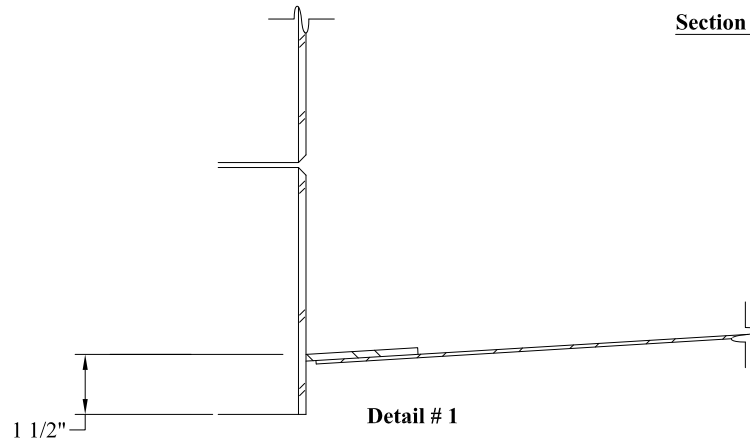


- | | |
|----|---|
| A | - |
| B | - |
| C | - |
| D | - |
| E | 1'- 0" |
| F | - |
| G | - |
| H | - |
| 1 | 1 @ "x" Std # concentric reducer |
| 2 | 2 @ " Std. # L. R. 90° |
| 3 | 1 @ " Std # x |
| 4 | 1 @ "x" I.D. x " O.D. (roll to ' Ø) |
| 5 | 1 @ " Std. # x |
| 6 | @ "x 6" x |
| 7 | @ "x 4" x |
| 8 | 1 @ 1/2" x ID x OD
w/ @ 7/8" Ø holes on a B.C. |
| 9 | 1 @ 1/8" x ID x OD
w/ @ " Ø holes on a B.C.
black neoprene gasket |
| 10 | @ " x " A307B zinc plate bolts
@ " A307B zinc plate nuts |
| 11 | 1 @ #16 SS screen x OD |
| 12 | 1 @ 3/4" # 9 flat expanded metal x OD
Paint expanded metal the same
material as the interior of the tank. |
| 13 | 1 @ 1/2" x ID x OD
w/ @ " Ø holes on a B.C.
Flanged to machined as shown |





Section A-A



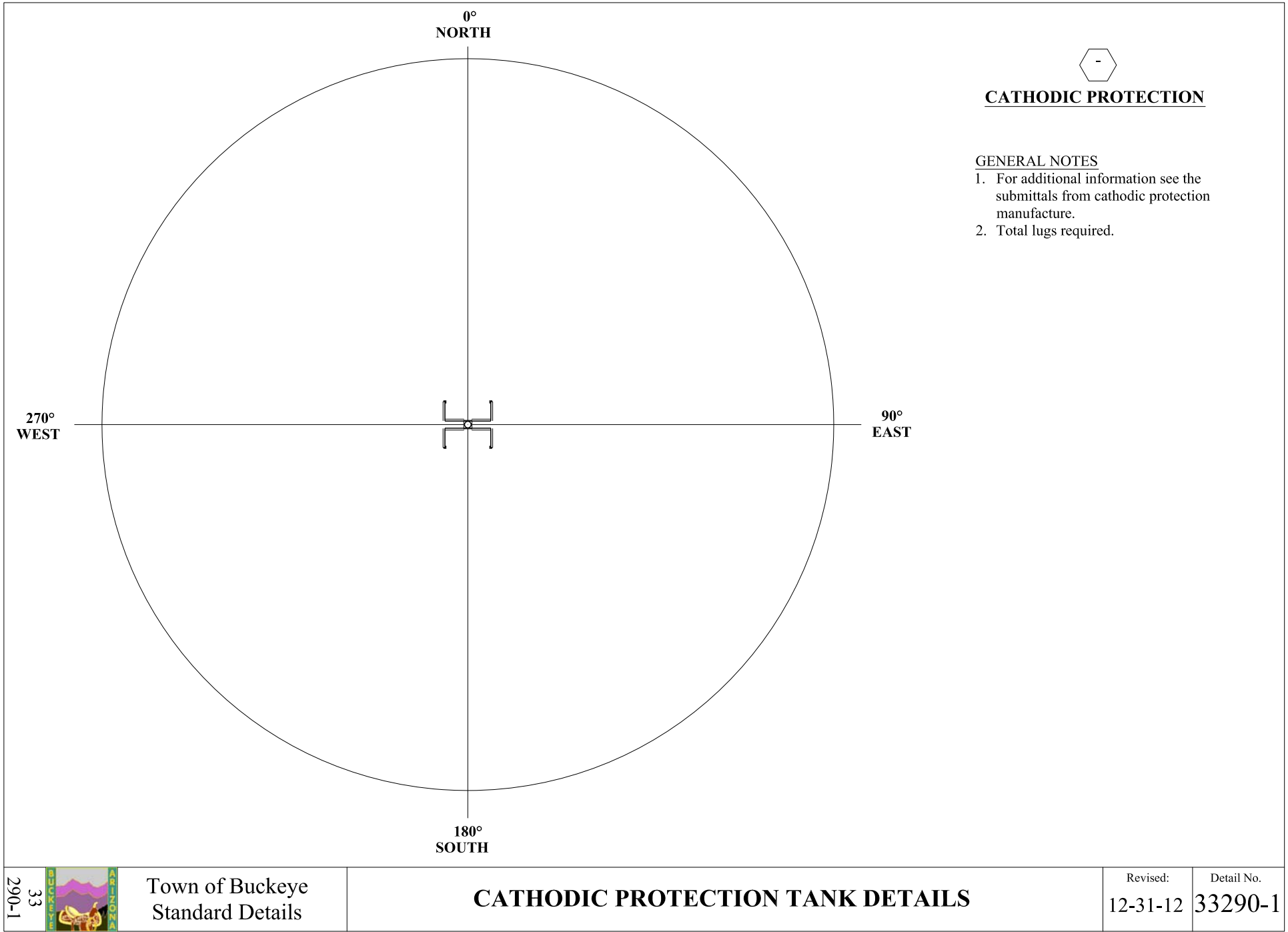
" Inlet

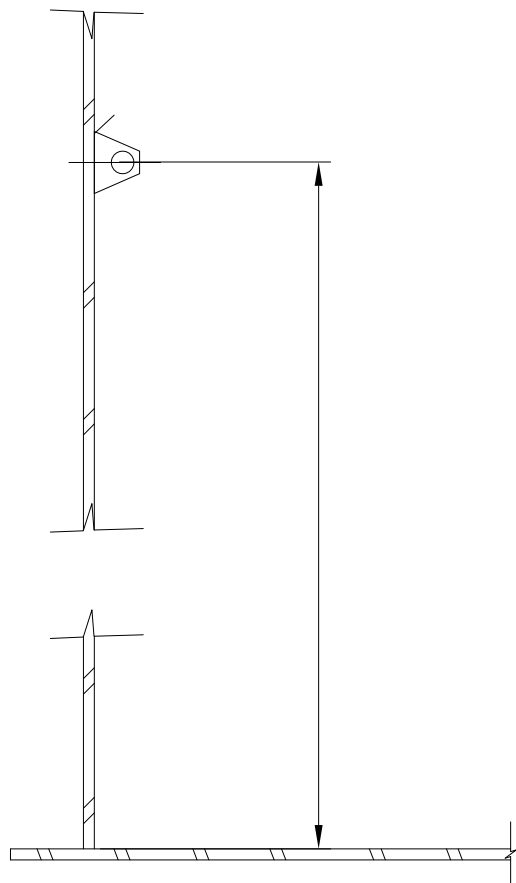
A	2'-0"	(1)	1 @ " STD# x
B	1'-0"	(2)	2 @ " STD# L.R. 90°
C	6"	(3)	1 @ " STD.# x
D	2'-0"	(4)	1 @ "x" I.D. x "O.D. (no roll)
E	-	(5)	1 @ "STD. #x"
F	-	(6)	@ "x 6" x
G	-	(7)	@ "x 4" x
		(8)	1 @ "150# FFSO

GENERAL NOTES

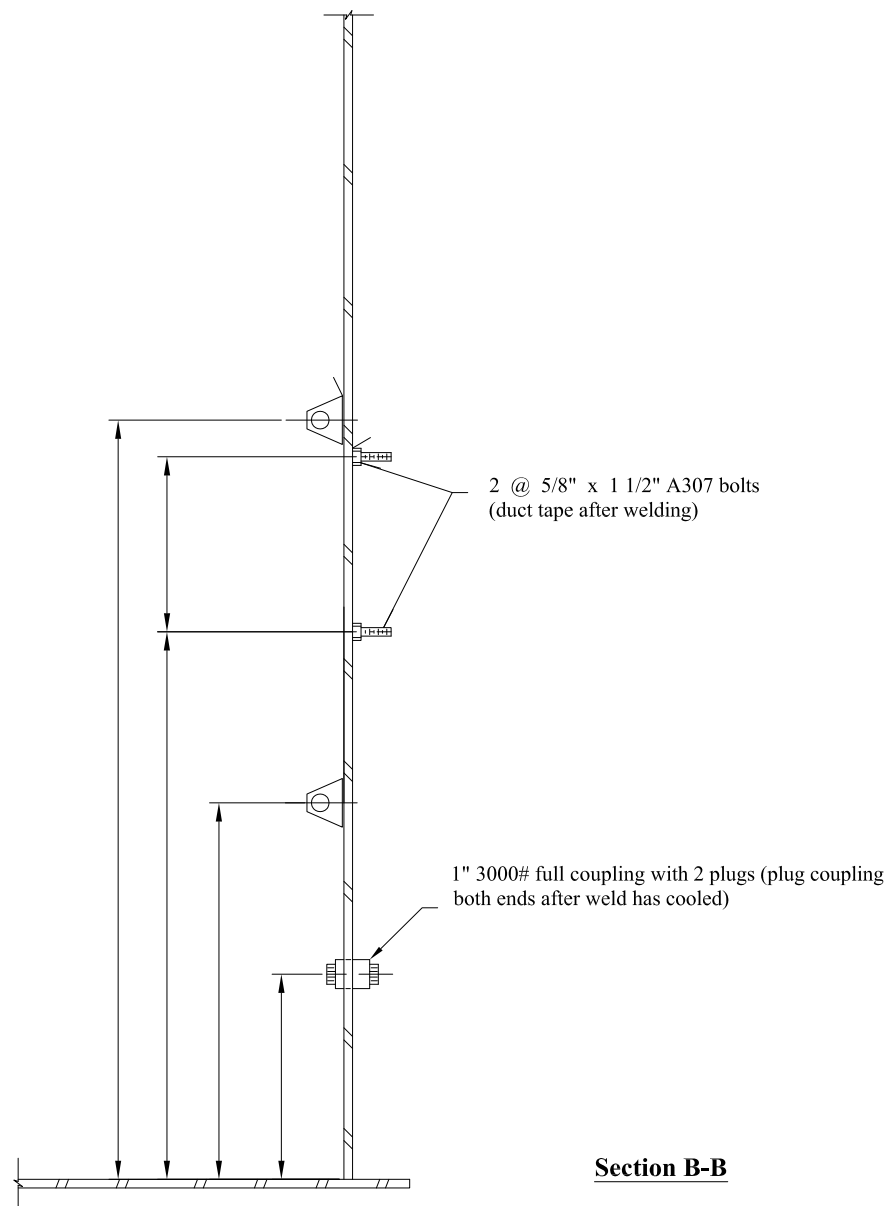
The inside of the inlet is to be blasted and coated with the same material as the interior surface of the tank. This work to be done prior to erection.





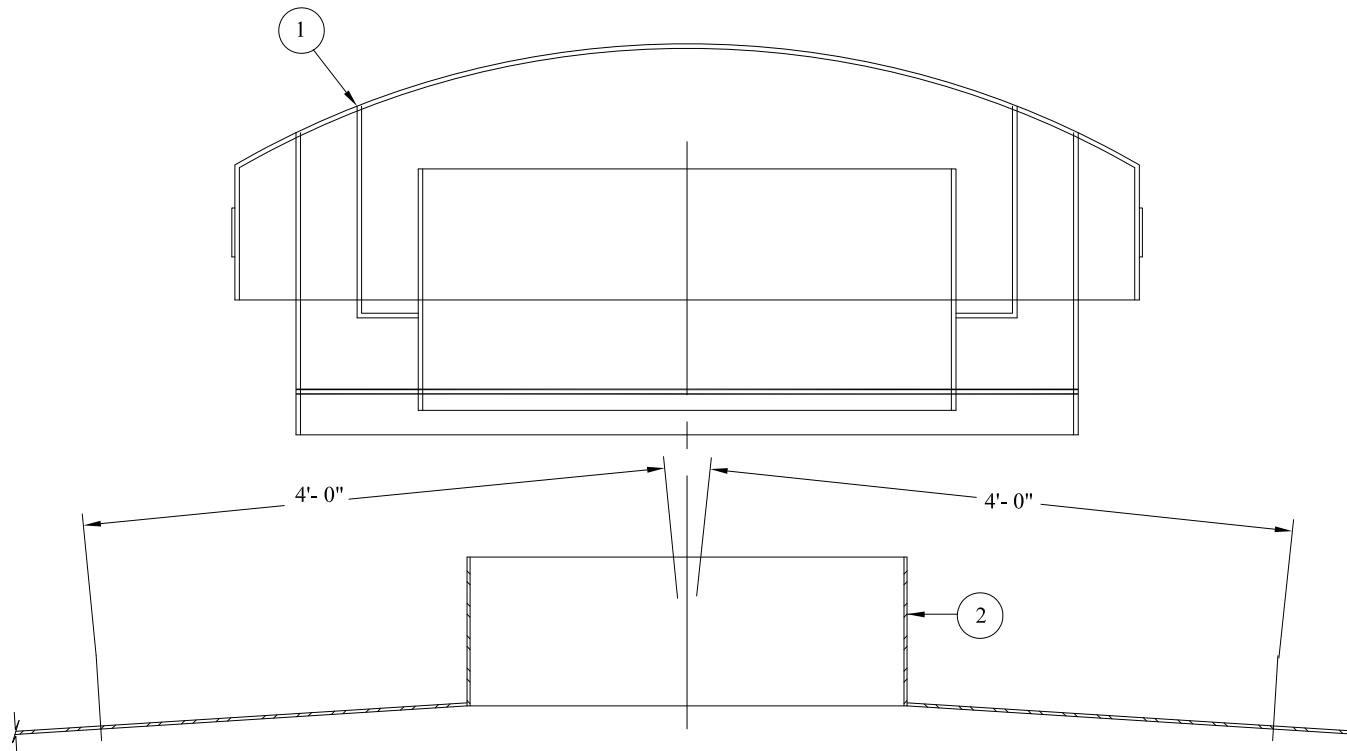


Section A-A (Required. - ° Apart



Section B-B

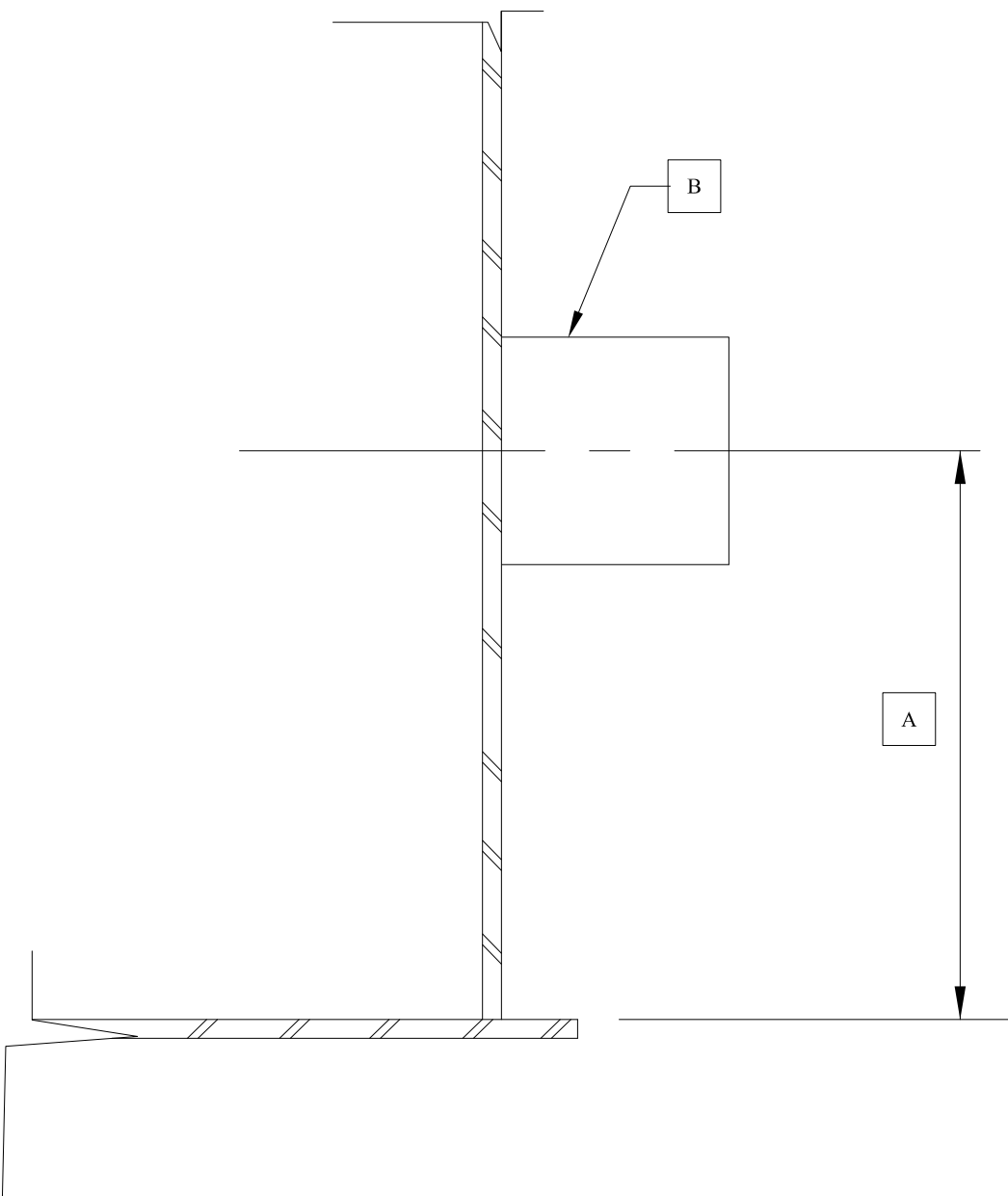




NOTE:

1. All vent material shall be 3/16" thick or thicker.





GROUNDING LUGS (Required)

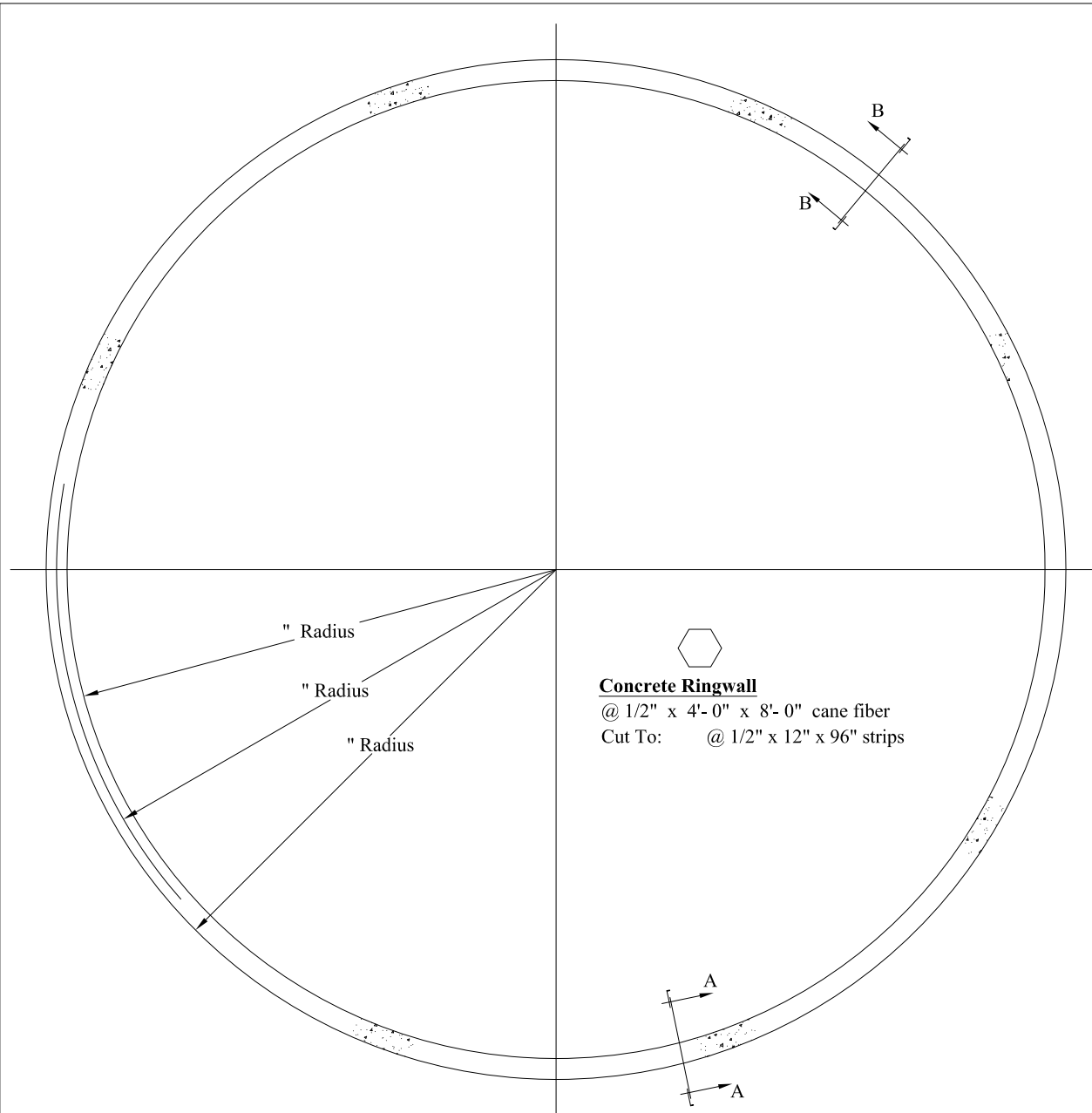
A

-

B

@ 3/8" x 4" x 4"

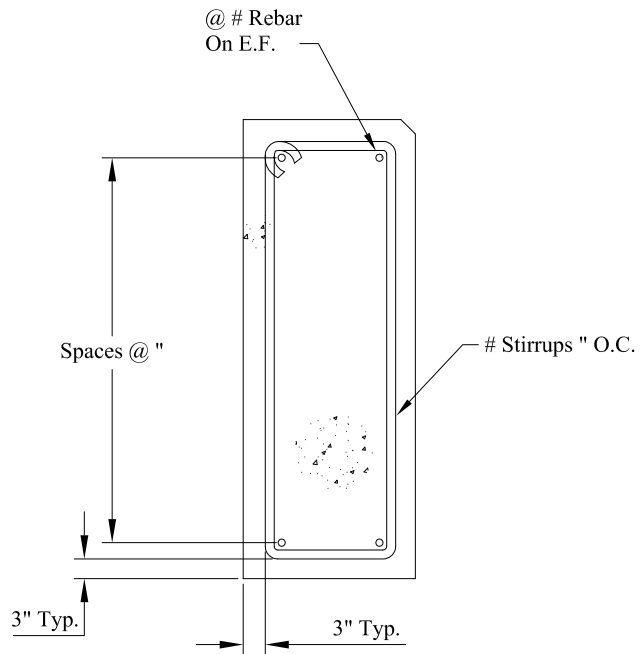




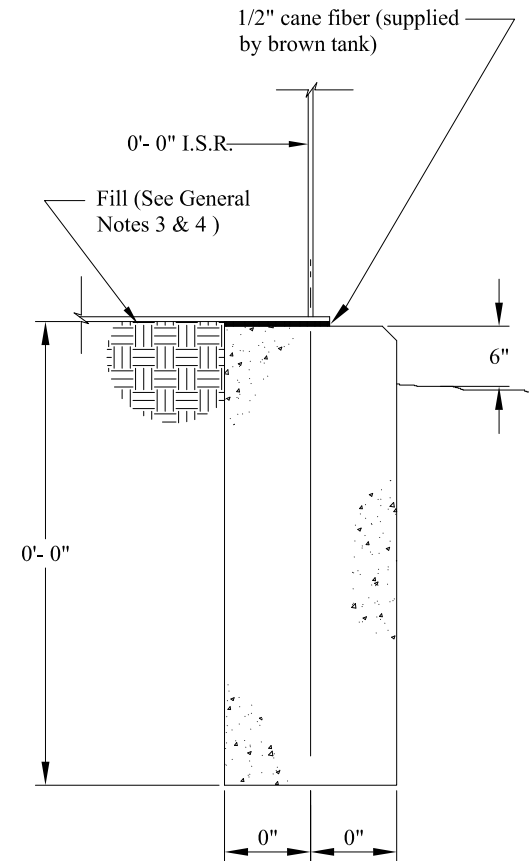
GENERAL NOTES

1. Excavation, soil preparation, and compaction shall conform to accepted engineering practice, or outlined specifications, for the bearing pressures predicted.
2. Concrete to be tested per specs.
3. Fill contained within ringwall to slope uniformly upward toward tank center a slope of 1" vertically to 10'-0" horizontally.
4. If material contained within ringwall is compatible, it shall be done per specs or soils report.
5. Ringwalls shall be level within 1/8" in any 30 ft circumference. Under the shell the levelness on the circumference shall not vary more than 1/4".
6. Ringwalls shall be:
 - a. 3000 PSI concrete
 - b. Grade 60 rebar
 - c. 24" rebar splices (Stagger splices)
7. Rebar inspection (if req'd.) shall be done prior to placing concrete.
8. Excavation and compaction at ringwall shall be done per spec or soils report.
9. Soil material other than washed rock or stone that makes contact with the tank floor shall be tested for resistivities, ph, soluble salts, sulfates and chlorides. These tests will validate whether the soil will corrode the underside of the tank floor. If these tests prove that the soil is corrosive, then alternate fill material must be used.
10. Tank not shown in General Plan for clarity, (See Section A-A).





Section B-B



Section A-A
Rebar not shown in this view
For clarity, see Section B-B

